Paper
TRADE JOURNAL

Jan. 4, 1952

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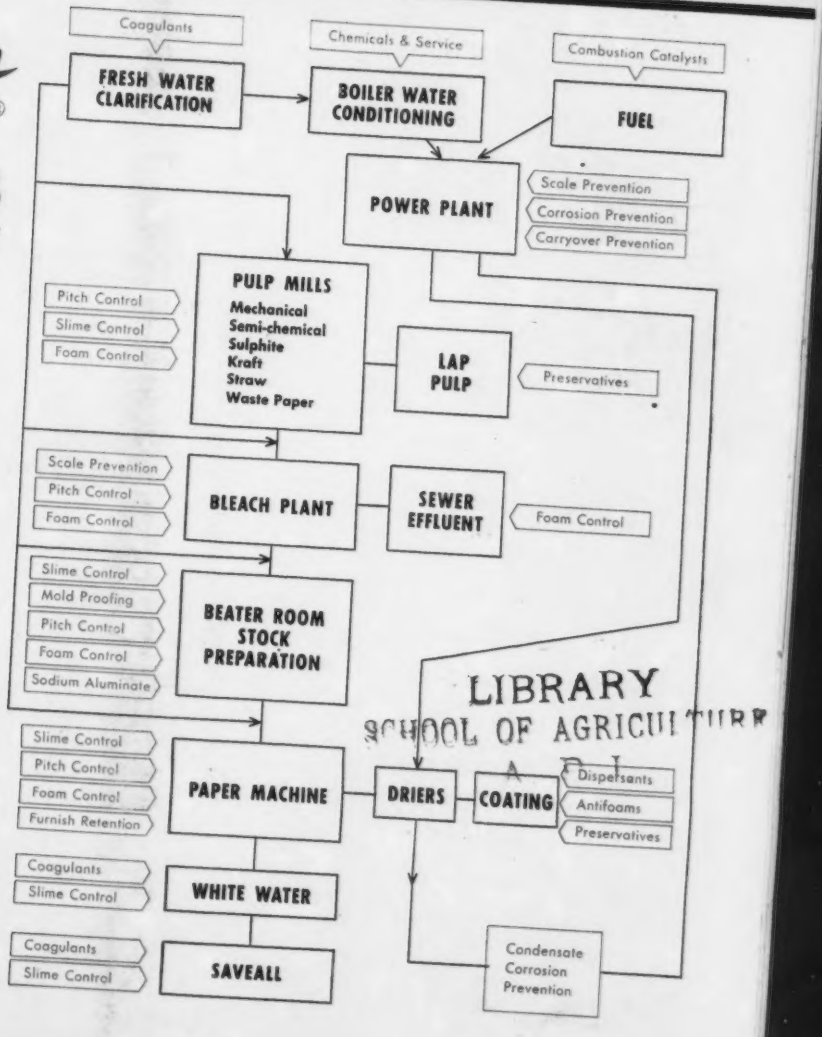

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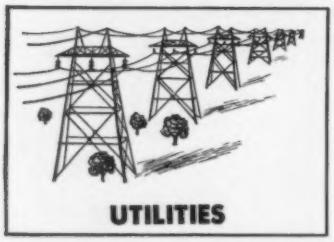

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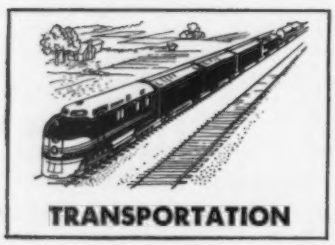

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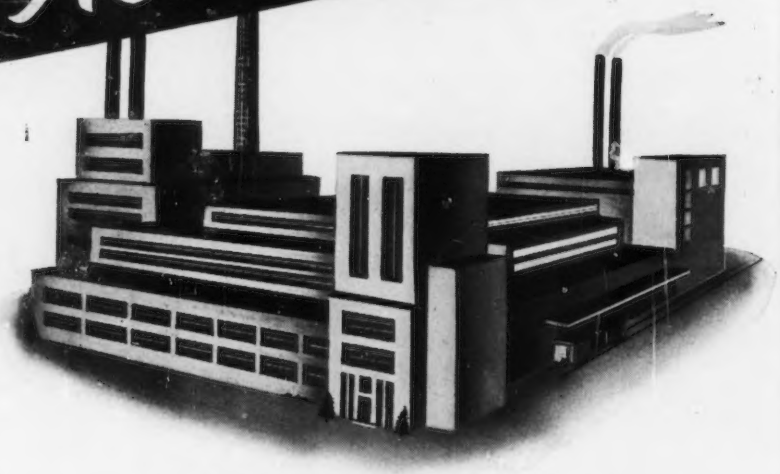

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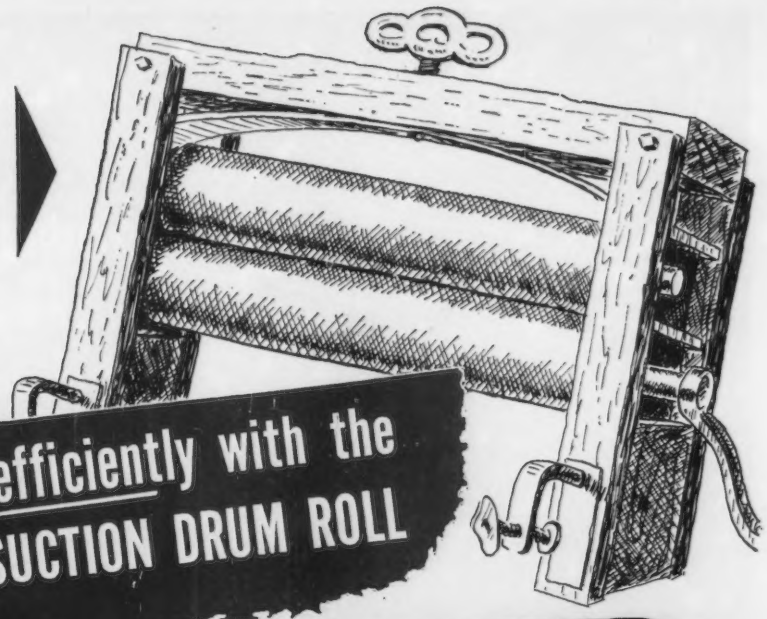

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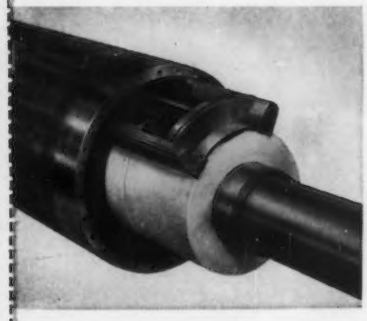

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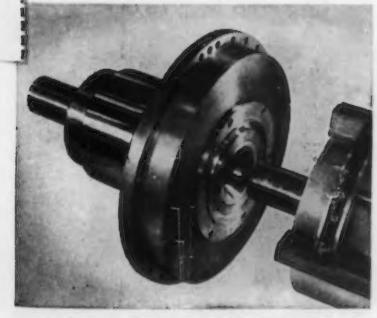

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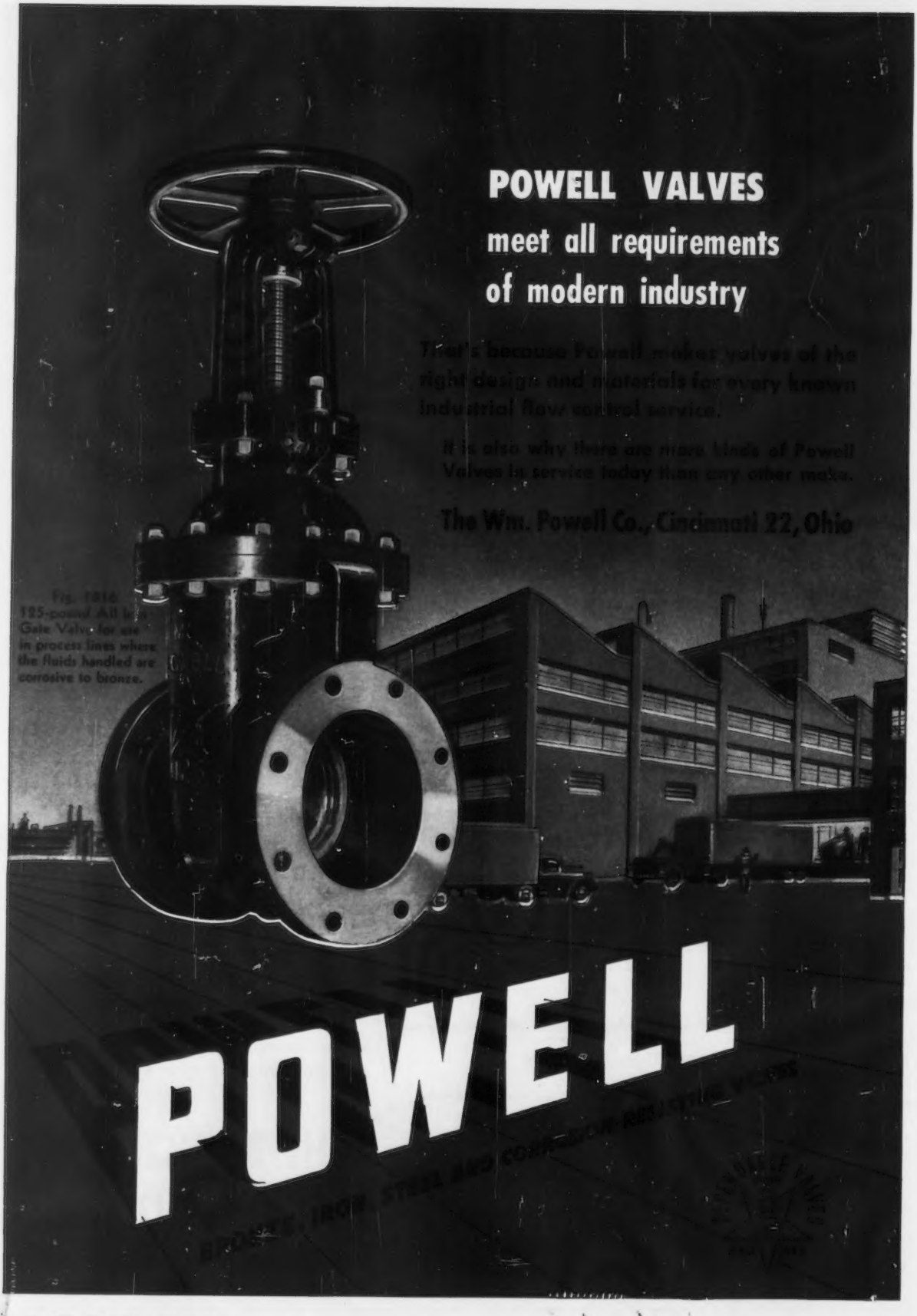
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Fig. 1816 125-pound All Iron Gate Valve for use in process lines where the fluids handled are corrosive to bronze.
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Paper TRADE JOURNAL

VOL. 134 JANUARY 4, 1952 No. 1

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NEXT WEEK

A very interesting and unusual description of the methods used for both static and dynamic balancing of a roll will be found in "Dynamic Balancing as applied to a Paper Machine Breast Roll" by A. Hillebrand.

REMEMBER THESE DATES

JAN. 14-17: Plant Maintenance Show and Conference, Convention Hall, Philadelphia, Pa.

JAN. 21: Chicago Section of the Technical Assn., of the Pulp and Paper Industry, Meeting, Chicago Bar Assn., Chicago, Ill.

JAN. 23-25: Annual meeting of the Canadian Pulp and Paper Ass'n, Mount Royal Hotel, Montreal, Que., Canada.

FEB. 19-22: American Pulp & Paper Assn., Annual Meeting, Waldorf-Astoria Hotel, New York, N. Y. Starts on Tuesday this year. 75th Annual Dinner Thursday, Feb. 21.

FEB. 20: Salesmen's Assn. of the Paper Industry, Annual Meeting and Luncheon, Waldorf-Astoria Hotel, New York, N. Y.

FEB. 18-21: Technical Assn. of Pulp and Paper Industry, Annual Meeting, Commodore Hotel, New York, N. Y.

MARCH 16-18: American Institute of Chemical Engineers, Atlanta Biltmore Hotel, Atlanta, Ga.

MARCH 24-26: The National Paper Trade Assn., Annual Meeting, Waldorf-Astoria, New York, N. Y.

MAY 5-8: Third Coating Conference of the Technical Assn., of the Pulp and Paper Industry, at the Sherman Hotel, Chicago, Ill.

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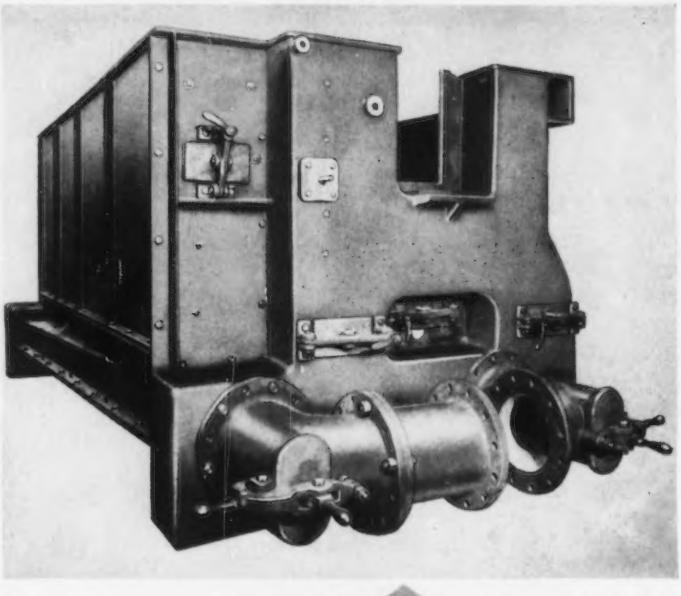
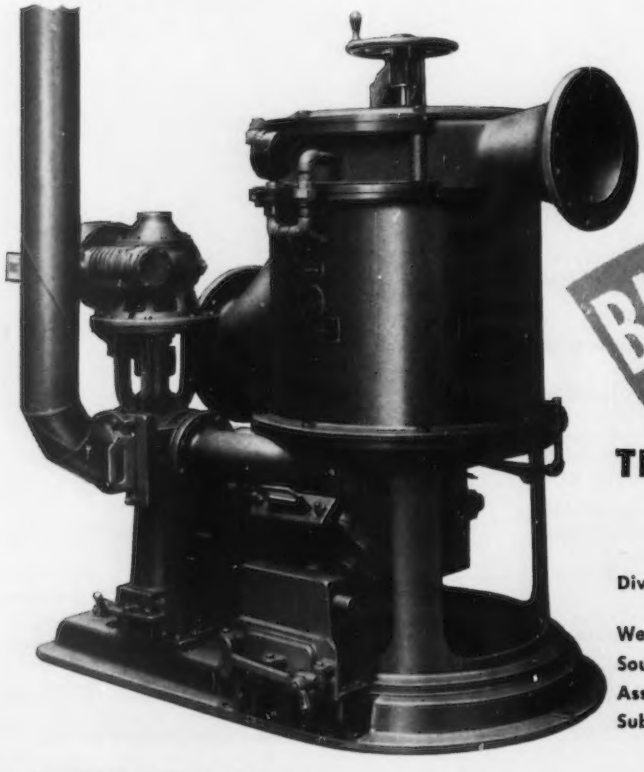


Black-Clawson Uni-flo Vat

Shartle Selectifier Screen



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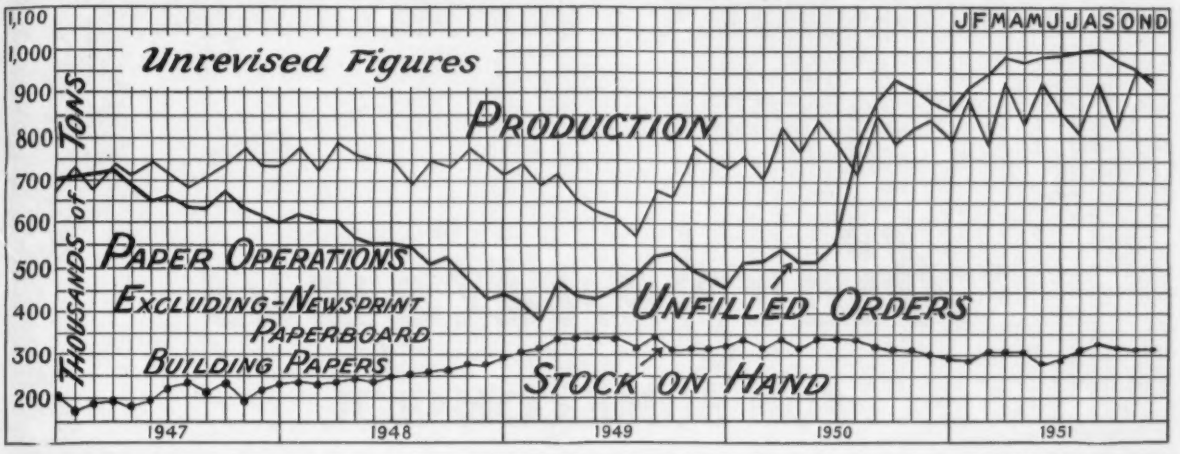

Brief of Important Figures

Source	Production	WEEK ENDING Dec. 22, '51	Nov. 24, '51	Dec. 23, '50
APPA	Paper Production Percent Capacity[3]	96.1	94.7	95.2
	Unbl. Kraft Paper Production Percent	104.4	102.5	98.3
NPA	Paperboard Operating Ratio Percent Inch Hours	86	75	105
		Nov. 1951	Oct. 1951x	Nov. 1950
APPA	Paper Production* (Except Newsprint and Building Papers) Tons	930,000	946,039	872,000
	New Orders Tons	864,000	941,862	831,000
	Unfilled Orders Tons	920,200	976,113	869,900
	Shipments Tons	920,000	946,295	872,000
		Nov. 1951	[4]Oct. 1951	Nov. 1950
NPA	Paperboard Production Tons	794,359	1,055,647	1,168,958
	New Orders Tons	685,733	1,110,638	1,225,369
	Unfilled Orders Tons	365,363	487,788	722,046
	Our Customers Activities Index[1]	**Latest Mo.°**	**Previous Mo.°**	**Year Ago°**
FRS	Manufactures Total Index	231	233	229
	Durable Mfg. Index	276	274	263
	Nondurable Mfg. Index	194	199	201
	Chemical Products Index	307	306	282
	Mfg. Food Products Index	178	190	173
	Printing and Publishing Index	181	180	183
ODC	Magazine Advg.-Printer's Ink Index	403	379	342
	Retail Sales Combined Adjusted Index	379.4	372.9	349.1
	Drug Index	253.0	251.4	237.3
	General Merchandise Group Index	394.4	392.2	364.6
	Grocery and Combination Index	446.0	449.6	395.1
	Prices Index			
BLS	Consumers Price Index[1]	187.4	186.6	175.6
	Wholesale all Commodities[2]	178.2	177.6	169.1
	Wholesale Foods[2]	189.5	188.0	172.5
	Commodities other than Farm Products and Foods[2]	166.7	166.9	161.5
	Wholesale Pulp and Paper[2]	200.5	199.7	173.4
	Purchasing Power of Dollar, Consumers Prices[1]	53.4	53.6	56.9
	General Activity Index			
FRS	Mfg. Production-Worker Payroll	429.4	436.9	415.8
	Unemployment Compensation Initial Claims (M)	902	725	720
	Miscellaneous Carloadings–Thousands of Cars	1,664	1,967	1,673
	Electric Output (Million KW hr.)	37,775	35,296	34,338
PTJ	Average 32 P & P Common Stocks as of Dec. 29	$37.48	$37.05	$33.62

[1] 1935-39 = 100 Unadjusted Index.
[2] 1926 = 100.
[3] New 6-7 day basis.
[4] For Five Weeks.
* For details see APPA Monthly Statistical Summary—November 1951 Estimated Figures.
° Latest Month Available on Request.
x Revised figures.

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Paper TRADE JOURNAL

TRENDS

Office of the PAPER TRADE JOURNAL,
Wednesday, January 2, 1952.

The first quarter of 1952 rolls in with a universal expectancy that a bettering of world market pulp supply is in prospect for the consuming mills.

Supporting such a belief are the numerous reports of new production and lesser demand from paper and rayon industries in the U. S. and Canada, as well as mounting mill pulp stocks.

In world markets, the important factor in market easing, however, is one of purchasing power: in many countries, a lack of dollars; in others, shortage of exchange for any foreign purchases.

Swedish Pulp Producers Anxious

That this one problem of exchange is likely to change the structure of the world market is told in the following excerpts from Swedish and British trade papers.

Says the *Swedish Wood Pulp Journal*, November 30 issue:

"The demand for cellulose to be delivered in the immediate future is still very good, and the stocks of both buyers and sellers are considered very small. The prices of consignments that could be made available for shipment this year — generally merely small quantities—have been well maintained though without any exceptional peaks such as occurred some months ago in sales to certain Central European and overseas markets. Beyond the quantities reserved for regular buyers in the more important customer countries, relatively few fresh sales have been made, and then generally for shipment in the first and/or second quarters . . .

"Even if the market is thus still firm with brisk demand, the long-term prospects seem rather uncertain, and many people in the trade believe the price curve to be culminating.

"The financial situation in Great Britain and France is causing anxiety, and Argentina has for a long time not been able to buy any Swedish pulp."

British Currency and Import Licenses

Latest news about the financial difficulties of Sweden's largest single pulp buyer, the United Kingdom, comes via the British *World's Paper Trade Review*, December 20 issue. (The British bought 661,881 short tons during 1950, France took 248,916 tons, the Argentine 50,565 tons, compared with U. S. purchases for the year of 355,206 short tons.)

Excerpts of the order which places woodpulp, paper (except newsprint), and boards, under import licenses indicate a change in British buying from Scandinavia. Briefed, the order reads:

"The total expenditure of sterling calculated on an f.o.b. basis on the purchase of woodpulp from all overseas sources in the six months from January 1 to June 30, 1952 will be limited to a fixed amount. A proportion of the total permissible expenditure of sterling on imports of each description of woodpulp will be made available for the purchase of woodpulp from Canada and the U. S. A.

"The amount of sterling which can be allocated for such purchases remain restricted, but it may be expected to provide for somewhat greater imports of dollar pulp, particularly unbleached kraft pulp in 1952 than in 1951, should the increased supplies be available.

"Where appropriate, producers will be advised of the maximum amount of sterling which they may be permitted to spend on the importation of each description of woodpulp from Canada and the U. S. A. within the limit of their total allocation of sterling calculated as stated above . . . Any sterling so allocated will be available for the purchase of wood pulp in either Canada or the U. S. A., and should North American pulp not be procurable to the full amount of the sterling allocation for the purpose, any balance of that allocation may be utilised for the purchase of wood pulp from European sources . . .

"Sterling allocations may be utilised entirely at the producers' discretion for the purchase of woodpulp from all European sources, but it should be noted that allocations, if any, for the importation of woodpulp from the U. S. A. and Canada reflect the lower f.o.b. prices ruling for supplies from these sources."

A Guess At Net Result

One might hazard a guess at the net result of these restrictions of sterling allocations on the world pulp price and not be too far afield. For it would seem that the need of pulp tonnage would induce British mills to buy where they could get the most for the least: in the U. S. at ceiling prices, or in Canada at somewhat higher levels, if the tonnages are available. Or they might draw price concessions from the Swedish producers.

Swedish Costs Much Higher

Swedish reports for some time have stressed higher wood and labor costs. But for this emergency in British finances, there had been indications that the Swedish price would have been lifted at least by the $20 difference which has existed between the Finnish and the Swedish prices during 1951.

Because of the keen competition for scarce pulpwoods, spruce has risen in one year from 46 to 62 crowns a cubic meter, fir from 37 to 57 crowns, for an average of 70 crowns a cubic meter, or 60 to 70 percent higher than last year's prices. Other costs of production, including depreciation of equipment, are named at between 300 to 400 crowns. Add to this the fourth-quarter export tax of 450 to 490 crowns per ton, and the net profit is rated as very small.

No 1952 Swedish Prices Fixed

Because of the uncertainty surrounding these matters, it is believed by Swedish writers that no 1952 prices will be fixed for some time to come.

4th Quarter Export Quotas Lifted

Noting that domestic wood pulp consumption had failed to reach anticipated levels during the fourth quarter, the Office of International Trade (OIT) announced last week that fourth quarter export quotas on wood pulp had been increased.

The quota for dissolving and special grades was lifted by 3,000 tons to 10,000; that for unbleached sulfate was raised by 5,000 tons to make 30,000 tons. No change in the bleached grades or in unbleached sulfite was made.

Quantities licensed for the fourth quarter with indicated destinations are as follows:

	Short Tons		
Country	(A)	(B)	(C)
Germany	1,295	7,857	749
United Kingdom	1,571	7,134	....
France	2,788	4,400	500
Brazil	11	6,395	1,197
Belgium	606	1,415	35
Cuba	576	450	420
Mexico	650	250	3,662
Japan	959	....	40
Other	1,544	2,099	397
Total	10,000	30,000	7,000

(A) Dissolving and special chemical grades.
(B) Unbleached sulphate.
(C) Bleached sulphate.

First Quarter Quotas Unchanged

Pulp export quotas for the first quarter are unchanged as originally announced: 7,000 short tons of dissolving and special chemical grades of bleached sulfite and bleached sulfate; 7,000 tons of paper grades of sulfite and bleached sulfate; and 25,000 tons of unbleached sulfate.

Improved International Credit Standards

With the new year, a new and improved set of rules governing international credit practices in foreign trade became effective in this and other countries.

The new code in its revised form is designed to aid a smother flow of international trade and to be of considerable benefit to U. S. exporters.

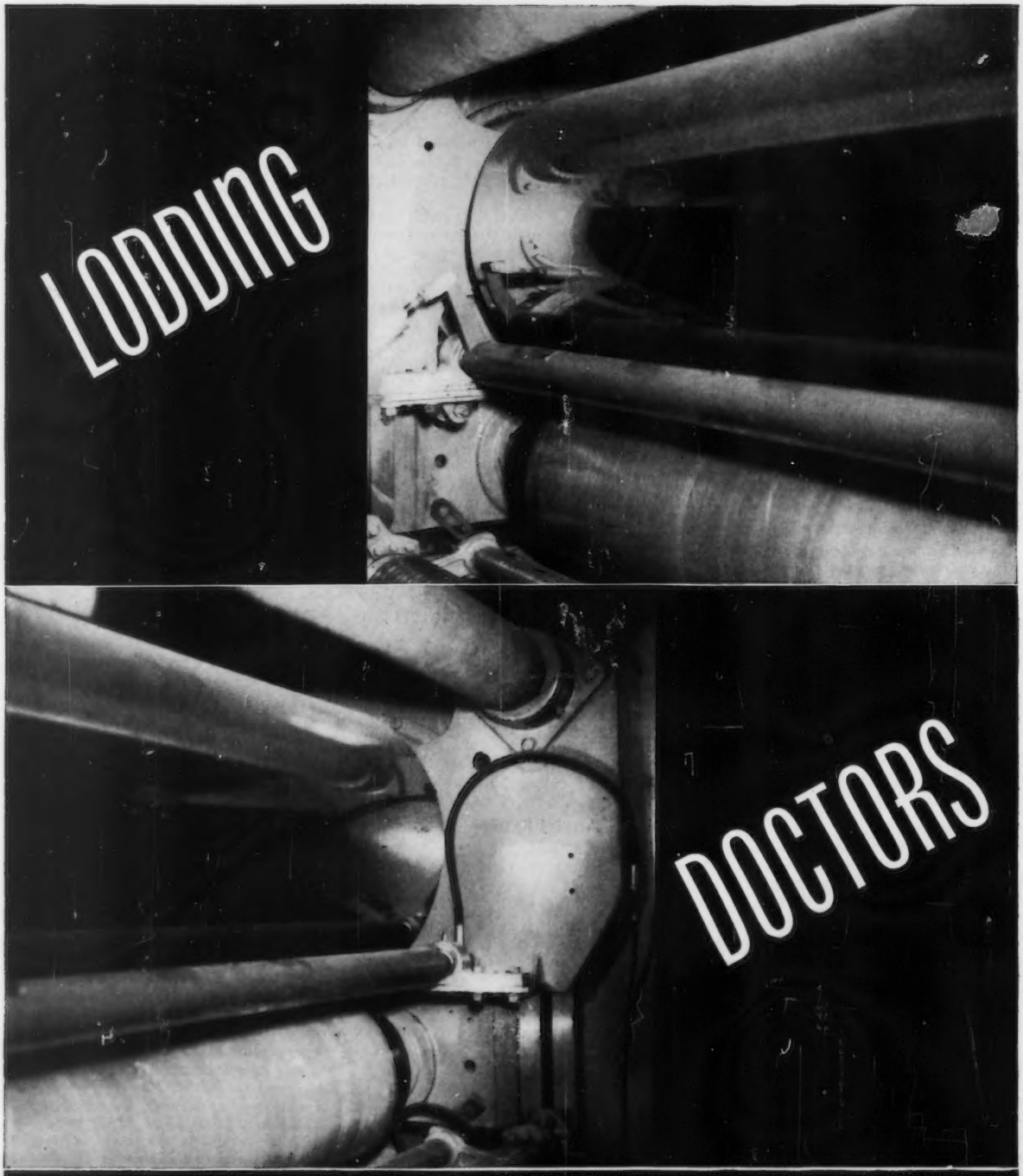
Chief revisions are removal of so-called "booby traps" in commercial letters of credit, and a clearer standard of bank responsibility in handling documentary credit in foreign trade.

—E.P.N.

Paperboard Production (Tons)*

	Dec. 22 1951	Dec. 15 1951	Dec. 23 1950
Production	203,923	200,151	241,058
New Orders	153,591	169,359	171,484
Unfilled Orders	333,224	387,000	598,431
% of Activity	86	86	105

* Source: National Paperboard Assn.



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News of the Week

Paper TRADE JOURNAL

American Construction Companies in New Zealand Newsprint Project

Acceptance by the New Zealand Government of a proposal under which a combine of two American construction companies and one from New Zealand will jointly build the first mill in New Zealand for the production of newsprint and chemical pulp has been officially announced in New Zealand by Prime Minister Sidney Holland.

The project, with a tentative total dollar volume of approximately $45,000,000, will be undertaken jointly by Merritt-Chapman & Scott Overseas, Inc., a wholly owned subsidiary of Merritt-Chapman & Scott Corporation; the Raymond Concrete Pile Company, both of New York; and the Fletcher Construction Company, Ltd., of Auckland, New Zealand. The same three companies are now jointly constructing a four-berth ocean freight terminal at Auckland, New Zealand, for the Auckland Harbour Board.

Major phase of the new project calls for the design, construction and equipment for operation at Te Puke, 165 miles southeast of Auckland, of a mill geared for the daily production of 150 tons of bleached sulphate pulp and 175 tons per day of newsprint. The three construction companies also will build a sawmill with a daily capacity of 100,000 board feet of lumber.

The pulp and newsprint mill and sawmill will be built for the Tasman Pulp & Paper Company of Auckland, New Zealand. The mills will operate under timber rights granted the Tasman Pulp & Paper Company in the Kaingaroa national forests south of Te Puke.

In addition to the mills, the project will entail construction for the New Zealand Government of 500 one-family homes at Te Puke for mill employees and erection of a deep water wharf at Tauranga for shipments to and from the mills. Tauranga, fronting the Pacific Ocean on the northeast coast of North Island, is approximately nine miles from Te Puke. The over-all project will entail the construction under separate contracts of approximately 37 miles of new lines for New Zealand Railways, which are owned and operated by the Government.

Negotiation of the contracts under which the combine of three companies will construct the mills, homes and wharf is expected to be completed in the near future. Subject to possible modification of plans in the interim, the total dollar value of the work involved is now estimated at approximately $45,000,000, with the pulp and newsprint mill accounting for approximately $33,000,000 of the total.

Fitchburg Rings the Bell

One hundred tons of steel scrap has been added to the nearly empty scrap piles of this country by Fitchburg Paper Co. It is the result of a week's work on their dump.

(Editor's note: So far as we know this is the first report of any paper mill efforts to help correct a desperate shortage. If there are any others, we would like to know about them.)

Farrel-Birmingham Acquires Consolidated Machine Tool

Farrel-Birmingham Company, Inc. of Ansonia, Conn., has acquired the common stock of Consolidated Machine Tool Corp., Rochester, N. Y., part of the consideration being securities of Farrel-Birmingham Company. The Consolidated plant will be operated as a subsidiary of the F-B Company and will continue production of its well established machine tool lines. Arthur H. Ingle will remain as president of Consolidated and will become a director of Farrel-Birmingham Company.

Bowaters Exercises Options

At least two McMinn County landowners have been officially notified that Bowater Paper Company, Ltd., plans to exercise its option on their farms as the English paper manufacturing concern prepares to erect a $50,000,000 paper mill in the Charleston-Calhoun area.

Union Bag Starts New Kiln

The latest step in Union Bag and Paper Corporation's current expansion program, a new lime kiln, went into operation recently, and is currently operating around the clock.

The new kiln turns out 175 tons of burned lime in a 24-hour day, and has more than twice the capacity of any of the three smaller kilns also in operation at Union Bag.

Installation of the new kiln required several months. It was engineered by Union Bag engineers, and actual erection work was done by Morton C. Tuttle Company.

Hamersley Celebrates 75th Anniversary

In 1952, The Hamersley Manufacturing Company, paper makers, of Garfield, New Jersey, will celebrate its seventy-fifth anniversary. The founder, Mr. Siegfried Hamersley was the inventor of Waxed Paper. Mr. Hamersley made candles in lower New York City, conducting his business in a sub-cellar due to the lack of refrigeration in those days.

His experiences with disintegration of wrapping paper on wet fish carried home from the Fulton Fish Market, led to his trying paper dipped in candle wax. These trials were so successful that he then designed and built the first waxing machine.

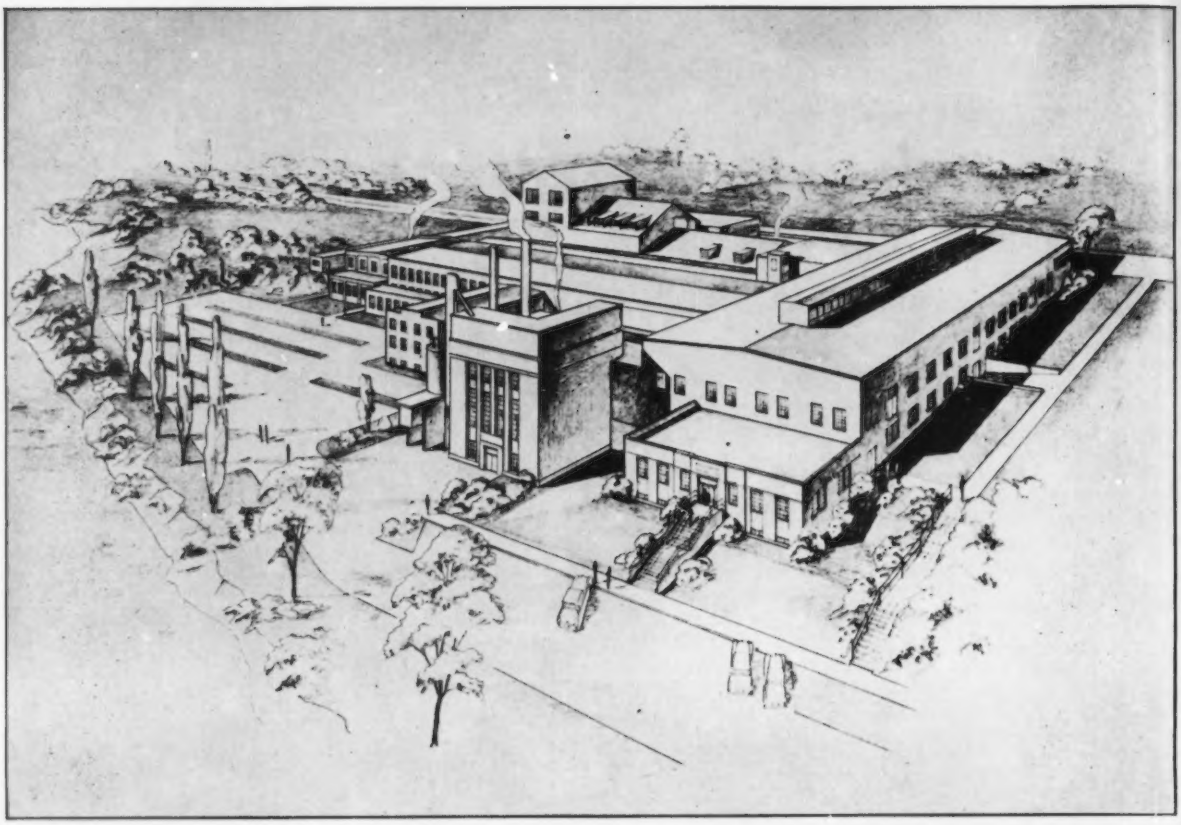
After the death of Mr. Siegfried Hamersley, the business was conducted by his sons, Mr. Carl S. Hamersley, and Mr. George W. Hamersley. In 1903, The Hamersley Manufacturing Company became the first paper mill in the United States to manufacture Greaseproof Paper. The third generation, Mr. Arnold G. Hamersley, is active in the business as Executive Vice-President.

The Company still continues to manufacture Glassine, Greaseproof, Laminated, and Waxed papers, as well as related grades in a completely modernized plant. The papers which they manufacture are largely used for the protection of food and also in connection with other civilian and defense uses. The Company employs over three hundred people. Mr. Walter L. Dawson, the President, and one employee, have been with them for over fifty years. There are also about fifty other men and women whose connection with the Company extends beyond a twenty-five year period, are thus members of the Quarter Century Club.

At this time, The Hamersley Manufacturing Company wishes to pay tribute to it's employees as well as to its suppliers and customers whose friendly relationship over a long period of time has contributed to the success of the Company and made this celebration possible.

Knowlton Grants Wage Increase

A wage adjustment involving approximately four cents an hour increase across the board to meet living cost advances went into effect among employes of Knowlton Brothers, Inc., operator of the Kamargo Mills and manufacturer of specialty papers.



This is a pre-view of how Provincial Paper Limited's fine-paper mill at Thorold, Ont., will look upon completion of its present multi-million-dollar expansion program. It includes the doubling in number of the present two paper machines, the tripling of their production of book, writing and other papers, the construction of what is blieved to be the most modern waste-paper pulping plant anywhere and the employment of fifty per cent. more personnel. Most of the construction will be finished and most of the new equipment installed by early next Spring.

Provincial Paper Expands Thorold Mill

Provincial Paper Limited's Thorold mill is being expanded under a multi-million-dollar program that embraces the doubling in number of its present two paper machines, the tripling of their production of book, writing and other fine papers, the construction of Canada's largest waste-paper pulping plant and the employment of fifty per-cent more personnel.

This first phase involves modernization and acceleration of the Thorold paper machines, which are of 140-inch and 90-inch widths, and the addition of a third machine of 136-inch width. These will raise the daily production from 55 tons to about 135 tons. Subsequent addition of a fourth machine, of 120-inch width, will ultimately more than triple the current output.

Believed to be the most modern of its kind anywhere, a new de-inking plant will supply a large part of the mill's fibre requirements. Its capacity will exceed 100 air-dry tons per day which will be supplemented by virgin pulps from Provincial's Port Arthur mill, from the Smooth Rock Falls plant of the parent company, Abitibi Power & Paper Company Limited, and from other sources.

A complete new laboratory will apply progressive quality-control through test stations and other procedures governing every step in the manufacturing processes.

Additional power for the expanded mill will be provided by a new Foster-Wheeler boiler capable of delivering 75,000 lb. per hour at 250 lb. pressure. This is in addition to the present boiler installation which delivers about 17,000 lb. per hour at 150 lb. pressure. The two will be brought into conformity so their combined capacity will be 92,250 lb. per hour with a peak load of 115,800 lb. The new Graver water-conditioning unit will deliver to the boilers what is, in effect, distilled water. There is also an electric boiler which is available as a spare.

The new ash-disposal system is pneumatic and will serve both boilers. It drops the ashes, sucks them into a hopper and drops them through a dustless unloader. Trucks delivering coal will be utilized to carry away ashes on their return trips. The disposal system is a product of the Chicago Fire Brick Company.

In order to handle the higher demand of the paper machines, the Stapley pulpers are being increased from four to eleven. This equipment is the invention of S. G. Stapley, production manager of the mill, and is manufactured in Canada by Wm. Kennedy & Son Limited of Owen Sound, Ontario.

The paper machines will be fitted with Valley flow boxes and Dominion fourdriniers. Suction presses and additional driers will be added as well as new reels supplied by John Inglis Company Limited, and new winders from the Appleton Machinery Company. The new machine room will include a rail crane running the full length of the building.

What is perhaps the world's most up-to-date finishing room, housed in a wholly new wing, will handle the machines' increased production. All roll finishing, including wrapping and weighing, will be done on the ground floor which adjoins the delivery end of the paper machines.

Also on the ground floor are the supercalenders which process about 25 percent of the mill's production. Their

PUT IT THERE
if you want well knotted, well screened pulp and lots of it, at low cost per ton

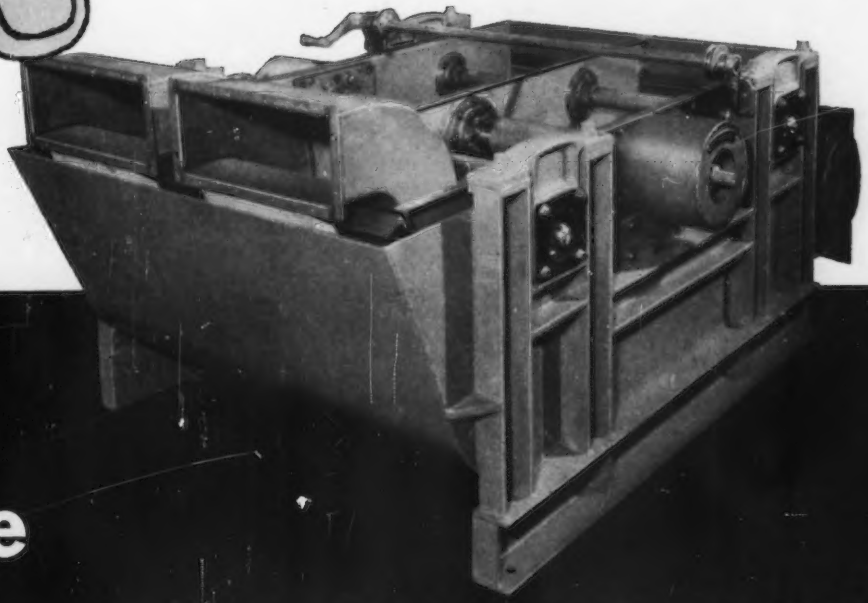
The Bird Jonsson Screen handles 80 to 100 tons of sulphite per day, 150 tons of groundwood and sulphate.

It handles sulphite up to 1½% consistency; sulphate and groundwood up to 2½%.

It only takes 3HP or less.

It takes up minimum space, costs little to install and maintain.

BIRD MACHINE COMPANY
South Walpole, Mass.



The BIRD JONSSON SCREEN

numbers have been increased to three, with Kohler wind and unwind reels, and their joint capacity has been raised by 50 percent.

The present rewinder, used for reconditioning and slitting rolls, has been supplemented by a new 120-inch Appleton winder. These machines are also on the ground floor of the new Finishing Room wing. Ample space has been provided here for the storage of roll paper waiting to be sheeted or supercalendered. There is also one cutter for cutting roll wrappers.

Rolls to be sheeted travel by crane to the upper floor of the wing. Here, five new cutters have been installed, providing a battery capable of sheeting 100 tons of paper per day, three times the Finishing Room's previous capacity.

From the cutters, the sheets travel by belt to pneumatic sorting tables. Here they are inspected by experienced operators who fan out the sheets for examination and remove the soiled, wrinkled or otherwise imperfect.

From the sorting tables, the sheets continue by conveyor belt to the guillotine trimmers which have been increased from three to four. After trimming, the paper is wrapped and packed for shipping. A new covered loading track adjacent to the finishing wing has room for four box cars and a new trucking platform for speedy loading of motor transports.

The augmented office staff will be housed in a new two-story concrete and concrete-block office wing. Timekeeper, general office and engineering staff will be located on the main floor, and the manager, production manager, personnel manager and purchasing on the second floor. Kitchen, lunchroom and first-aid rooms will be located here.

About 250 construction workers have been engaged on the project since it was initiated early this year. Its designers and engineers are The H. K. Ferguson Company, of Cleveland, O. The contractors include Provincial Engineering Limited and Robertson Construction & Engineering Company Limited, both of Niagara Falls, and the W. A. Yates Construction Company Limited, of Hamilton.

A.P.W.

ONLIWON

INDUSTRIAL
TOWELS
TISSUE

Quality Waste Papers

It is the time to start a full-time, well-financed organization to stop the destruction of high-grade waste paper. A valuable secondary source of fiber is progressively becoming non-salvageable. The arch criminal in this case is not low price, or poor collection, but Technology itself. This is a startling charge when one considers the great debt we owe to Technology for new grades of paper, new paper products, and much of the expanded use of paper.

Nonetheless, at the same time that research and development have been giving us almost unlimited benefits, they have been destroying the re-use of our products after primary use. Wet strength, latex, synthetic adhesives and ink vehicles, heat-seal, and varied other treatments, in many cases, do not lend themselves to deinking and defibering methods.

Thus, this whole broad technical development is destroying the primary raw material supply of many of the nonintegrated mills which are the source of a major part of our paper supply. Mills without direct sources of virgin wood pulp will be in hard circumstances if something is not done about the expanding group of deleterious converting materials.

Now is the time to organize a full time, well-financed corporate body with the following objectives:

1. To trace down the identity and source of materials which cannot be defibered or deinked by commonly-employed paper mill methods.

2. To work with printers, binders, and all types of converters to determine the effect of new processes, ink, adhesives, and all other new materials on the re-use quality of waste paper.

3. To work with suppliers of converting materials to determine if their new materials will prevent re-use of converter waste and the effect of the converted product when it gets into the collection. If modification is possible so that degradation is prevented at the source, an additional selling point for the new product has been developed, and a major headache eliminated. If modification is not possible then adequate must be given to all concerned to the end that the waste must be eliminated in sorting the collections, and converters waste must be burned.

Many attempts have been made in the past to eliminate degrading materials. Asphalt-lined and wet-strength bags are supposed to be identified and prominently marked. This procedure has been haphazardly carried out. Publicity has been given on various other treatments to such as polyethylene coatings which do not lend themselves to known processes.

The end results have all been the same: Due to lack of knowledge, lack of proper means of identification, carelessness, and primarily because the attack is not made at the source of the trouble by a full-time paid technical organization, these unusable stocks get into the bales and ultimately into the paper-making system.

To the above, a fourth objective can be added: That of research and development into better deinking and detreatment methods from both chemical and mechanical standpoint.

No segment of the paper industry has been subjected to more get-rich-quick promotions than the deinking process. And yet there is little fundamental research. Practically all commercial methods in use have grown from the individual whims of the operating staffs who are thinking in terms of using conventional papers, wherein, some mechanical cleaning, a little alkali, detergent, defibering, bleaching, and washing action takes place.

Thus we find some mills able to use "wet strength" easily; others cannot; some get away with small amounts of wax; others not any at all. All of which adds to the confusion of the dealer and sorter who finds a packing acceptable to one mill and poison to another. Hence many waste-paper treatment plants are based on good luck instead of the sound foundation of knowledge with good planning.

There is the problem! Upon its solution lies the future of many non-integrated mills which are too small to own their source of virgin pulp.

How can the problem be solved? It would seem that a smal committee representing both waste paper industry and the consumers should bet set up and invested with authority to commit themselves and their companies to the suggested program.

This group should set up a full-time permanent organization. Finance it and put it to work. Inasmuch as the problem is one for the high-grade mills, the financing should be limited to the higher grades of waste. With the financial and moral suport of the major users and their suppliers, the threatening problem of raw material can be attacked energetically. It would seem that a few cents per ton would be ample when volume consumed is considered. The results will be measured in dollars per ton saved, in fiber loss, machine time and rejections.

A still further objective could easily follow the primary objectives. As everyone knows in a booming market the NAWMD (National Association of Waste Material Dealers) grade specifications are subject to a very liberal interpretation and often the source of heated discussions. This organization might easily supervise grade

paper sculpture by goreckа-egan

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Maine Black Bear Award—J. Larcom Ober, (right) vice president of the Scott Paper Company, Chester, Pa., and chairman of the University of Maine Pulp and Paper Foundation, is shown receiving the Black Bear Award from Professor John B. Calkin for "outstanding service" to the University of Maine.

quality and act as the unbiased arbitrator for the benefit of both the consumer and producer of this important raw material.

The stakes are high. Clean waste paper of uniform high quality can yield a profit to the converter and packer, and assure the "high-grade" mills of a reliable source of excellent fiber. It's time to start Right Now!

Henry J. Percy

Paper Industry 4th in Fuel Use

The fuel bill of Paper and Allied Industries ranks 4th in all manufacturing industry in 1950. It is surpassed only by Primary Metals, Chemicals, Stone and Clay, and Food. It was $174,426,000 in 1950 up from $147,670,000 in 1947.

The purchased power bill was $61,183,000 in 1950 compared to $50,000,000 in 1947.

Sulphite League Research To Continue

Wisconsin pulp and paper mills have voted to keep their sulphite pollution research program going at full speed, the Sulphite Pulp Manufacturers' Research League announced today. At their annual meeting here the League directors, representing twelve companies with sulphite pulp mills in Wisconsin and Michigan committed their firms to contribute money for a 1952 research budget substantially larger than the League's 1951 total outlay.

"Wisconsin and Michigan sulphite pulp manufacturers are keeping up their cooperative research and putting more money than ever into it, even though several of our members already are going ahead with active programs to build plants that will control sulphite pollution at their mills," said J. M. Conway, president of the League and of the Hoberg Paper Mills, Green Bay, in a statement accompanying his announcement. "The industry is sincerely determined to continue its work on this difficult scientific problem until the chemists and engineers can show us ways that will be practical, judged by both technical and economic standards.

"We proposed to reduce sulphite pollution in the streams of these states to manageable proportions just as rapidly as modern research develop methods that we can use," Conway continued. "We will keep our technical staff, our laboratories, our pilot plants, our research projects at cooperating universities, and our experiments in full-scale industrial plants all running full steam ahead until we overcome the difficulties inherent in the task.

Sutherland Honors Employes

The Sutherland Paper Company Dec. 15 feted 139 of its employes who have been with the firm 25 years or longer. This included eight women and 131 men.

Three men, including L. W. Sutherland, chairman of the board and cofounder, received special recognition for having been with the firm since its organization 35 years ago. They are Maurice Goodwin and James Bachelder, in addition to Sutherland. All 25-year employes received diamond set gold service pins.

PEOPLE

MR. GEORGE I. CROLL, formerly with National Folding Box Company of New Haven, Conn., has joined Continental Folding Paper Box Co., Ridgefield, N. J. as Vice President of Sales.

GEN. E. R. QUESADA, retired, has been elected vice-president and director of Olin Industries, Inc., East Alton, Ill., it was announced today by John M. Olin, president.

Gen. Quesada, who recently retired from the Air Force as Lieutenant General after 27 years of service, will be directly concerned with Olin Industries' contemplated expansion program in the field of cellulose and minerals.

CLAUD CHRISTIANSEN, widely experienced chemical engineer, has been appointed to supervise a new research project of the Pulp and Paper Research Institute of Canada according to an announcement by L. R. Thiesmeyer, president of the Institute. Mr. Christiansen's research work is sponsored by thirteen pulp and paper companies across Canada and covers the study of the cause of corrosion in kraft pulp mills.

"Corrosion in equipment making kraft pulp, used in the manufacture of wrapping, bag, printing, tissue, envelope, and fine papers and products in which strength is a requirement, is a problem to pulp producers everywhere throughout the world," said Dr. Thiesmeyer. "It already represents a loss of some hundreds of thousands of dollars annually to our industry and, for unknown reasons, appears to be increasing."

Claud Christiansen

Mr. Christiansen is an honor graduate in chemical engineering of Oregon State College. He has been connected with such firms as the Crown-Zellerbach Paper Company at Camas, the St. Regis Paper Company in Tacoma, St. Mary's Kraft Corporation, the Weyerhaeuser Timber Company in Longview, and most recently Potlatch Forests, Inc., Lewiston, Id.

(Continued on page 39)

contact is important

EXCLUSIVE FEATURES OF THE VICTORY BEATER

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VICTORY BEATERS are made in two styles: (a) **Single Roll** units for handling batches as small as 500 pounds. (b) **Multi-Roll** units with two, three, or more rolls for treating 100, 150, 200 or more tons per days on a continuous production basis.

For positive fibrillation and accurate pressure control, it is absolutely essential!

Uniform contact between roll and bed plates in the *Controlled Flow* VICTORY BEATER* is a masterpiece of engineering unequalled in paper making history! Centralized bed plates and hydraulic lifting cylinders provide up to 40 tons of pressure against the vertically stationary beater roll.

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On-the-job performance records prove the complete superiority of the *Controlled Flow* VICTORY BEATER to any similar equipment. All the facts are available for your examination, so write, wire, or phone for Booklet PT 152.

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GOVERNMENT GOSPEL

Packaging Materials Sufficient

Packaging materials and all types of paper and paperboard, nearly all adhesives and coatings, will be sufficient to meet demands in the first half of 1952, the NPA reported last week.

Industry members reported they would be able to meet anticipated demands for containers to package ammunition, food, drug, pharmaceutical and chemical products for the first six months of the coming year.

More Tin Plate For Fiber Cans

Tin or terne coated steel sheets rejected —during processing because of imperfections, would be channeled exclusively to fibre can and tube makers, under a recommendation to the NPA from representatives of those industries.

These rejects are used as metal ends for the fibre containers, it was pointed out, and the recommendation, if approved, would enable the industry to make greater use of the metal. NPA agreed to consider the proposal.

New Emphasis on Water Conservation

A hint of a new drive on industrial water pollution was seen in the announcement that NPA will set up a Water Resources Division, charged with responsibility of gearing industrial water supply to defense requirements.

"The Water Resources Division may have to take positive action in attacking pollution of national water resources," the newly-appointed director of the division, Harvey S. Howe, said on taking over.

"Less critical material is needed to treat water wastes at their source than to reclaim the water into which they are dumped."

Thus, it was stated, to provide for downstream water requirements of defense plants and supporting communities, the Water Resources Division "may need to insist in some instances on the building of sewage treatment plants."

The division will have no responsibility for navigation, flood control, reclamation, hydro-electric generation of power or irrigation except for pumps and piping supplies, recreation, etc.; however, where these operations also involve water for domestic and industrial purposes, the Water Resources Division "will have direct interest and responsibilities," it was said.

The division is intended "to make effective use of the nation's water resources" said NPA, particularly with regard to needs of defense plants, military reservations and civilian population.

It was recalled that in World War II, hundreds of war plants were built without full consideration of their water needs, entailing otherwise unnecessary outlays of materials and equipment to rectify the situations.

Responsibility of the division will include ground and surface water supply, transmission, pumping, treatment, storage and distribution for domestic and industrial use; and liquid wastes and sewage collection, pumping, treatment and disposal, whether from domestic or industrial sources.

The director is from West Orange, N. J., and will be assisted by James C. Crenshaw, Richmond, Indiana; both have had extensive War II service with emergency agencies in Washington, it was recalled.

Wood Pulp Quotas Announced

Supplementary fourth quarter 1951 as well as first quarter 1952 export quotas for wood pulp were announced today by O.I.T.

The fourth quarter quota of 7,000 tons of dissolving and special chemical grades of wood pulp was increased by 3,000 tons to make a total of 10,000 tons for the quarter. The fourth quarter quota of 25,000 tons of unbleached sulphate was increased by 5,000 tons to make a total of 30,000 tons for the quarter. These increases were possible because of a reduction in the anticipated fourth quarter consumption in the United States. The additional quotas for the fourth quarter have already been licensed.

First quarter 1952 export quotas are: 7,000 short tons of dissolving and special chemical grades of bleached sulphite and bleached sulphate wood pulp; 7,000 short tons of paper grades of sulphite and bleached sulphate wood pulp; and 25,000 tons of unbleached sulphate. These quotas are equal to those originally established for the fourth quarter.

Where Metal Goes

Direct defense and defense-related construction and production will dominate the demand for carbon steel, copper wire mill and brass mill products beginning in January, the NPA reports.

These defense demands will absorb more than 40 percent of carbon steel supply, and about 60 percent of the other products named, the agency said.

Allotments for the first quarter can be divided into three broad categories; direct defense, defense-related, and all other production and construction, it was stated. Outlook for the first quarter showed:

The estimated supply of copper wire mill products is 360,000,000 pounds; 56.8 percent of CMP allotments are for direct defense or defense-related production and construction; 43.2 percent for all other production and construction.

The aluminum supply is estimated at 620,000,000 pounds; 59.8 percent of CMP allotments will be for defense or defense related purposes.

Comic Magazine Conservation Plan

Publishers of comic magazines, in cooperation with the National Production Authority, U. S. Department of Commerce, are seeking a voluntary agreement among themselves to reduce the number of returned copies and thus conserve newsprint, NPA announced today.

A recommended method was unanimously approved by publishers authorized to do so at a meeting with officials of NPA's Printing and Publishing Division on December 12. Others present who were not authorized to commit their respective firms agreed in principle, NPA said, and approval by those firms is expected.

Under the proposal, comic magazine publishers would reappraise their press runs with the object of reducing by at least 10 percent the expected percentage of returns. The rate of returns reduction would be established in relation to the existing average rate of returns.

Each publisher would furnish suitable records of print orders and returns from press runs quarterly to NPA, beginning with the second quarter of 1951. This information would be available only to NPA.

The proposed agreement states in part:

"It is not the intention or purpose of this agreement to restrict the free right of any publisher, including those who may subsequently elect to enter the field, to issue such publications as they may wish to issue. The purpose is only to control by a voluntary agreement between the publishers, such excessive returns as may eixst and to reduce these by a formula to be mutually adhered to."

NPA will submit the proposal to the Department of Justice, requesting approval.

All publishers in the comic magazine industry will be invited to enter into voluntary adherence to the plan.

The effort to conserve newsprint for comic magazine publishers is in line with that of newspaper publishers who in some sections of the country are practicing a voluntary plan to limit press runs so as to reduce the number of unsold newspapers.

Additional information may be obtained by writing to the Printing and Publishing Division, National Production Authority, Washington 25, D. C.

(Continued on page 39)

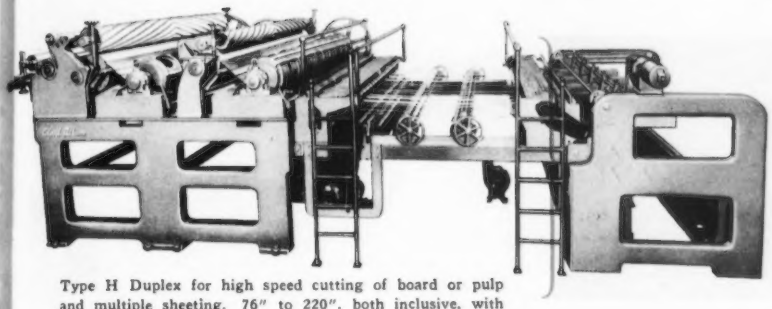
One of these combinations will do your sheeting job *faster, better, at lower cost.*

You don't have to "make do" with a sheeter designed to fill everyone's needs and which, as a result, does no one job well.

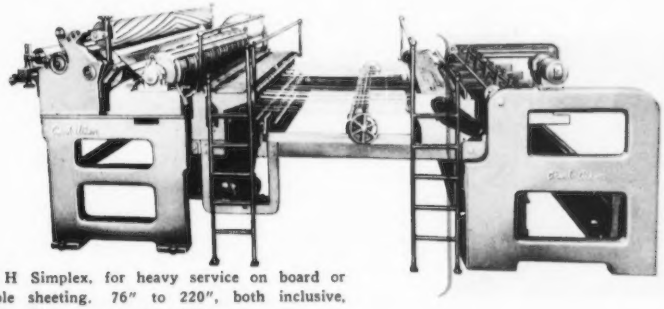
You can select from the Clark-Aiken Complete Line a cutter *exactly* suited to your sheeting needs equipped with a layboy *exactly* suited to requirements and the conditions existing in your mill.

In addition, you can enjoy the advantages of such cost-cutting, quality-improving Clark-Aiken features as: oversize pinch roll and oversize sand-blasted draw roll for positive feed; lifetime tapes for long wear and freedom from stretch; scale slitter and jogger alignment for quick, accurate sheet alignment without use of measuring tape; patented self-sharpening, scissors-action "Spiral Shear" cylinder knife for clean, sharp cutting on any stock, and many others.

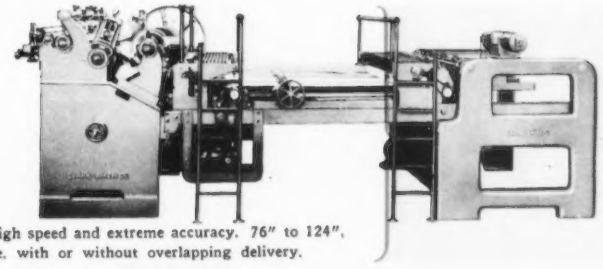
Clark-Aiken engineers will gladly help you make the proper selection. Write, or wire or phone The Clark-Aiken Company, Lee, Massachusetts.



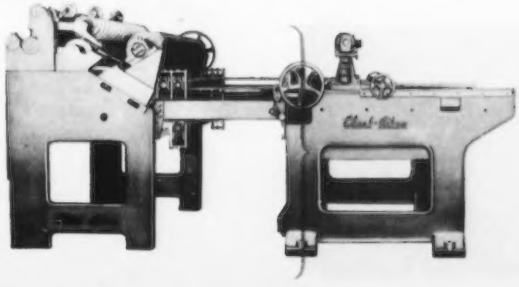
Type H Duplex for high speed cutting of board or pulp and multiple sheeting. 76" to 220", both inclusive, with or without overlapping delivery.



Type H Simplex, for heavy service on board or multiple sheeting. 76" to 220", both inclusive, with or without overlapping delivery.

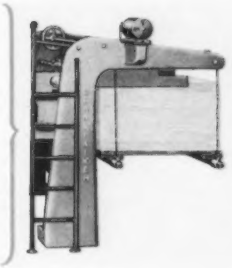


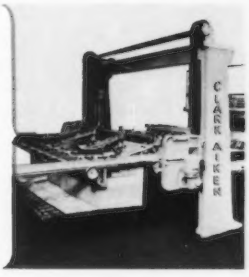
Type C for high speed and extreme accuracy. 76" to 124", both inclusive. with or without overlapping delivery.



Type D Economy for finishing room service and use of convertors. 36" to 100", both inclusive. Available with or without overlapping delivery.

Overhanging Type Layboy for end or side pile removal, greater pile height, fast skid removal and replacement and fast return.





Vickery Type Layboy. A new conception of piling. Skids rest on floor and delivery rises as pile height increases. End or side pile removal permitting use of track system for removal and skid replacement.

Clark-Aiken
CUTTER-LAYBOY UNITS

AUSTRALIAN NOTES

At the recent annual meeting of shareholders of the Australasian Paper and Pulp Co. Ltd., Chairman Sir Norman Brookes said that it was doubtful if the present restricted permitted rate of new capital flow will meet the needs of even the basic industries. He added that the increase in the company's nominal capital from £10 million to £20 million was a preliminary to new issues which will have to be made to further the expansion of the manufacturing company, Australian Paper Manufacturers Ltd.

The latter company, in its latest financial year, produced a record total of paper, pulp and board and enabled the parent company to pay an ordinary dividend of 7 percent. It speeded up its construction program rate by 250 percent, yet held its prices substantially below the cost of similar imported products. As part of a program to ensure future supplies of pulpwood it planted more than two million pine trees and, moreover, is proud of the fact that, surrounded by industrial troubles in other industries, it enjoyed a full year of industrial harmony.

Giving shareholders of the News Ltd., Adelaide, reasons for the shortage of newsprint, Chairman J. S. Murray sharply criticized the Tasmanian Government for its treatment of the newsprint mills near Hobart. "Hydro-electric power supply for the mills suddenly failed us," he said. "Drought was only one reason for this. The other and quite inexcusable reason was that the Government had sold to small consumers the power it had promised to us, and when confronted with its difficulty passed a simple Act of Parliament abrogating all supply contracts. The Commissioner decreed a rationing scheme based upon 1950 usage, shutting out our new plant which became ready this year to make about 2,000 tons of newsprint a month. Thus a plant on which our company, together with a group of Australian publishers, had just spent — with the blessing of the Government and the promise of electric power — no less than four million pounds, was shut up."

But W. A. Ball, chairman of B. J. Ball Ltd., says that it appears likely that the severe shortage of paper has at last been overcome as tonnage from Canada and the United States will now supplement Scandinavian supplies. Trade opinion conservatively estimates the current annual consumption of paper in Australia at around 450 000 tons. Last year's Australian production was approximately 225,000 tons.

A plan of the Fletcher Construction Co., Auckland, N. Z., in association with two U. S. companies, to utilize the vast State softwood forests in the center of North Island, has been accepted by the Government. Mills to produce newsprint, chemical pulp, and lumber are planned.

Estimated annual output under the scheme has been estimated at 60,000 tons of newsprint, 35,000 tons of bleached kraft pulp, and 40 million board feet of insignia pine timber.

Licensing treatment of paper and board from hard currency areas and the procedure to be followed is the subject of recent advice from the Comptroller-General of Customs. An overall figure has been set aside within which Australia's dollar spending on imports must be maintained, and it is announced that quoted prices will be considered when granting applications.

ASSOCIATIONS

New Paper Machines Described at Michigan Sup'ts December Meeting

Five top executives of the Michigan paper industry were the guest speakers on the program of the December dinner meeting of the Michigan Division of The American Pulp and Paper Mill Superintendents Association. They were: Maxwell Bardeen, president, Lee Paper Company, Vicksburg; George N. Carleton, president, Detroit Sulphite Pulp and Paper Company, Detroit; William Race, president, Sutherland Paper Company, Kalamazoo; Bruce M. Martin, manager of production, American Box Board Company, Grand Rapids; and Frank H. Stowitts, vice-president in charge of manufacturing, Michigan Carton Company, Battle Creek.

The theme of the meeting was Michigan's new paper machines, and each of these five executives treated this subject as it concerned the activities of his own firm.

Mr. Bardeen, for example, described his company's new machine as a Beloit cantilever-type Fourdrinier capable of producing fine writing, printing and reproduction papers at speeds up to 500 feet per minute. The drive of this machine, according to Mr. Bardeen, is of a fundamentally new design, permitting sectional speed adjustments of highest accuracy.

Mr. Carleton, in explaining the details of his company's new machine, related that it is a Beloit combination Yankee Fourdrinier designed for speeds up to 1800 feet per minute, and that, at the present time, it is running at speeds of 1300 to 1400 feet per minute. Mr. Carleton also commented that the machine produces light-weight uncreped tissues for wrapping and converting purposes; and that its most conspicuous innovation is a pressure stock inlet.

Mr. Race traced the development of his company. He said that the first paper machine was installed in 1921, that three more machines were added in 1928 by the merger with Standard Paper Company, and that another machine was added a few years ago. This relatively new machine, said Mr. Race, is a Black-Clawson eight cylinder machine, equipped with 113 dryers, that is capable of producing paperboard at speeds up to 400 feet per minute. In further commenting on the machine, Mr. Race related that it is housed in a new building, that it is supplied with the necessary fiber furnish from a new continuously-operating stock preparation system, and that a new automatic layboy has been added to the layout during the last few months.

Speakers at the December 13 Dinner Meeting of the Michigan Superintendents:
Standing L. to R.—William Race, President, Sutherland Paper Co.; Frank H. Stowitts, Vice President in Charge of Manufacturing, Michigan Carton Co.
Seated L. to R.—George N. Carleton, President, Detroit Sulphite Pulp and Paper Co.; Bruce W. Martin, Manager of Production, American Box Board Co.; and Maxwell Bardeen, President, Lee Paper Co.

Mr. Martin reported on the plans of his company to have a new paper machine in operation in the near future in its Filer City mill. This machine, stated Martin, is to be a Black-Clawson cantilever-type Fourdrinier with certain unusual features. Among the features mentioned by Mr. Martin were the following: The stock will be

(Continued on page 40)

A New Technique For Determining Accessibility in Paper Pulp

Geoffrey Broughton and C. S. Na
Department of Paper Engineering, Lowell Textile Institute, Lowell, Mass.

Cellulose, whether cotton, wood pulp or regenerated fibre such as viscose, is generally considered to be made up of an ordered (or "crystalline") structure, linked or interspersed at points by segments in which a less ordered (or "amorphous") arrangement of cellulose molecules exists (1). The degree of disorder or amount of amorphous material in a given pulp might well be expected to influence tis properties both physical and chemical and, therefore, to be of some importance and worthy of determination. The non-crystalline or amorphous fraction should have lower density and tenacity, be more readily swollen and more reactive to chemical reagents. It may well be that it plays an important initial role in beating.

Methods of determination, whether physical or chemical, have in the past been time consuming, but the recent work of Nickerson (2) suggests that formic acid esterification as a means of accessibility determination is rapid and could be adapted to routine work. While X-ray methods probably remain as the ideal for the estimation of the degree of crystallinity, in practice it is usually the amount of reactive cellulose which is of greatest interest. For this, the formylation method seems to offer a rapid check on the reactive content of different celluloses.

Briefly, 0.2500 gram of the pulp is weighed out and allowed to stand for a given length of time in about 15 cc. of 98% formic acid at a controlled temperature. The mixture is filtered through a Gooch crucible and the fibres washed until no traces of acid appear in the filtrate. The crucible is then placed in 50 cc. of N/10 alcoholic potassium hydroxide and after refluxing to complete saponification the excess alkali is back titrated. Nickerson (2) suggested that two hours at 30°C. might well be a suitable formylation period for estimation and comparison of accessible cellulose where rapid comparison of a number of materials was required.

Figure 1 shows the percentages of combined formic acid obtained with an unbeaten, bleached sulfite pulp at 25°C.

The curve obtained is similar to those found for viscose and other textile materials. Complete formylation of one hydroxyl group per glucose unit would correspond to 24.2% combined formic acid and Nickerson (2) found that this figure was approached comparatively rapidly by a number of starches and white dextrin, which

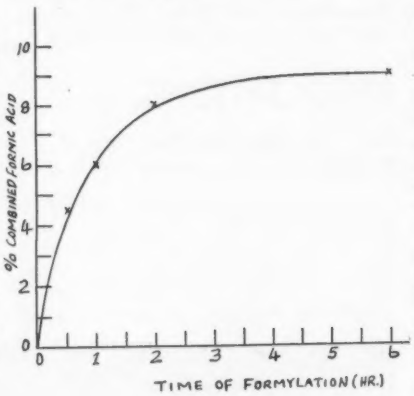


Figure 1

might be expected to be completely accessible materials. He suggested, therefore, that the assumption below be made:—

$$\frac{\text{Combined formic acid in cellulose sample}}{\text{Combined formic acid in white dextrin}} \times 100 = \text{\% Accessible Cellulose}$$

By plotting results for a number of formylation times and extrapolating back to zero it was possible to minimize any effects due to swelling and, as a result, opening up of more amorphous areas to the reagent. With this method, viscose rayon showed 28-30%, mercerized cotton, 14-15%, and unmercerized coton, 8-9% of accessible cellulose. Taking Nickerson's values for dextrin, determined under somewhat different conditions, the results of *Figure 1* indicate about 30% accessible cellulose for the pulp under consideration. This compares with values of about 40% which have been found by the moisture-regain method (3). Taking two hour values, as suggested by Nickerson, the accessible cellulose would be about 40%, closer to the moisture regain method.

For many purposes, however, absolute values are not required and it is desired only to obtain comparisons of accessibility. For this, it should be sufficient to determine under one set of conditions combined formic acid for all the samples of interest.

The changes occurring during beating have long been a matter of conjecture (4) and it was decided to use the method for this problem. In view of the great increase of external specific surface of the pulp which results from beating, it might be expected that some change in the crystalline-amorphous ratio of the pulp would be found, although Bergman and Johnson (5) in agreement with earlier investigators, have found no increase in moisture regain upon beating and hence no change in the ratio of accessible to non-accessible cellulose. X-ray methods also show no change.

Results on hand sheets formed from bleached sulfite and bleached kraft pulps after various beating times in a 1½ lb. Niagara laboratory beater are shown in *Table 1*. Formylations were carried out in duplicate at 26°C., 50°C., and 75°C.

While the results are fairly consistent and seem to point to a slight increase in accessibility with beating, it was thought that if the pulp were not dried before soaking in the formic acid even greater increases might be observed. Hence, a sample of bleached sulfite after the beater treatment was taken, drained and washed successively with acetone and benzene. In this way, it was expected that any changes due to drying might be avoided. *Table II* indicates the results together with an air-dried check.

The reverse of what was expected

TABLE I

VARIATION IN ACCESSIBLE CELLULOSE WITH BEATING CALCULATED FROM FORMYLATION VALUES. (ONE HOUR FORMYLATION)

Pulp	Beating Time (mins.)	% Combined Formic Acid			Accessible Cellulose Ratio Beaten/Unbeaten Pulp		
		26°	50°	75°	26°	50°	75°
Bleached Sulfite	0	6.0	12.3	18.2	1.0	1.0	1.0
	30	7.0	13.0	19.5	1.16	1.06	1.07
	60	7.3	12.8	19.5	1.22	1.04	1.07
	90	7.5	13.4	18.7	1.25	1.09	1.03
	120	7.7	....	19.8	1.28	....	1.08
Bleached Kraft	0	6.9	16.0	16.4	1.0	1.0	1.0
	30	6.5	16.5	19.6	0.94	1.03	1.19
	60	7.6	15.7	19.6	1.10	0.98	1.19
	90	7.0	17.9	18.5	1.01	1.12	1.13
	120	9.2	17.2	20.0	1.33	1.07	1.22

TABLE II

FORMYLATION VALUES OF BEATEN AND UNBEATEN PULPS AFTER WATER REMOVAL BY SOLVENT EXTRACTION

Treatment	Beating Time (Mins.)	Formylation Time (Hrs.)	(50° C.) % Combined Formic Acid	Accessible Cellulose Ratio Beaten/Unbeaten Pulp
Air dried	5	1	9.2	1.0
	120	1	13.1	1.42
Solvent extracted	5	1	10.9	1.0
	120	1	12.5	1.15
	5	20	18.3	....
	120	20	24.6	....

was found, the air-dried sample showed a greater increase in accessible cellulose fraction than the solvent dried material. Thus, it appears that air drying does not result in any decrease in the readily reactable fraction.

On two of the samples, namely bleached sulfite beaten for 30 mins. and 120 mins., oxidation rates were determined using the chromic acid method (6). The longer beaten pulp showed a slight increase in oxidation rate, taking up 0.031 moles of chromium trioxide per hour, as compared with 0.027 for the pulp of shorter beating time. This indicates a small increase of accessibility with beating, in agreement with the formylation results.

The formylation method can probably be extended to problems other than the changes occurring in beating and, as shown, offers a rapid, easy method for following changes in accessible cellulose content.

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Industrial Truck Battery Requirements

J. E. Vaughan[1]

Determination of capacity of storage batteries which power electric industrial trucks is often left to the truck supplier, the battery representative, just plain guess, or duplication of present batteries. However, there is an engineering procedure, which, if followed, will enable the purchaser to correctly specify his own battery requirements or check suppliers' recommendations. In addition, these calculations will insure against purchasing under-capacity batteries which run down before the end of the shift, or conversely, over-capacity batteries calling for unwarranted initial cost.

To illustrate the procedure for determing industrial truck battery capacities we will assume a typical case—a 3,650 lb. truck, 2,000 lb. load, 3 ft. average lift, 110 ft. average haul and 30 ft. 10 percent grade to be traversed by loaded trucks.

It will be necessary to determine the power (watt hours) required to traverse the average haul distance loaded, climb the grade, traverse the haul distance empty (grade deducted), lift the load for stacking, and tilt the mast for load-centering.

Figure 1 indicates the watt hours per ton required to move a truck along a given length of *level* run. We can use this graph to determine the power required to travel the average haul distance. By following the dotted lines we see that 5.4 watt hours are required to haul 1 ton along the 110 ft. haul of our example. Our total load is 3,650 lb. (truck) plus 2,000 lb. (load)—5,650 lb., or 2.825 tons. Multiplying 2.825 tons by 5.4 watt hours

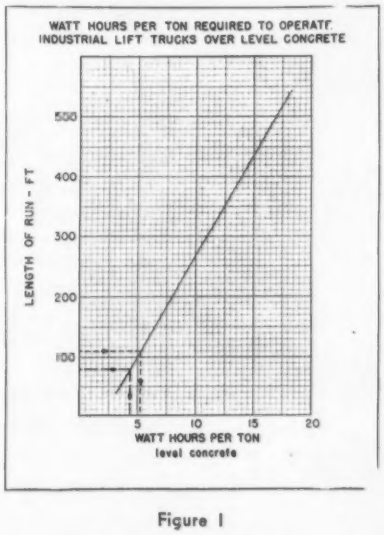

Figure 1

gives 15.25 watt hours required for the level run.

We can determine the watt hours required for going up grade (in addition to that required for level running) by using the formula: watt hours = tons (truck plus load) × ft. (length of grade) × grade (percent) × .013 (a constant). 2.825 tons × 30 ft. × 10 × .013 = 11.02 watt hours (extra power for grade).

Then to calculate watt hour requirements for the empty return trip, deducing the grade, we have the 110 ft. total return distance less the 30 ft. of grade, or 80 ft. Again using the graph (dashed lines), we see that 4.4 watt hours are required per ton on the return trip. As the weight is now 1.825 tons, we multiply 4.4 watt hours by this figure getting 8.03 watt hours.

To determine the watt hours required for lifting, we use the following formula: watt hours per lift = tons of load × ft. of lift × 2 (a constant). Thus, 1 ton × 3 ft. × 2 = 6 watt hours required to lift the load. (For unstacking, the following formula applies: watt hours per lift empty = 1/3 load capacity in tons × ft. of lift × 2.)

To determine the energy required to tilt the mast, we use the following formula: watt hours per tilt loaded = tons of load × 1 (a constant). Thus 1 ton × 1 = 1 watt hour per tilt loaded. (Watt hours per tilt empty = 1/3 load capacity × 1.)

Summing up we have:

Run with load, no grade	15.25 watt hrs.
Extra power for grade..	11.02
Run empty, grade deducted	8.03
Power required per lift..	6.00
Power required per tilt..	1.00
	41.30 watt hrs. per trip

Assuming 250 trips per day, a total of 10,325 watt hours of battery power are required. If we select a 32 volt battery as recommended by truck manufacturers for this size truck, it must have approximately 326 ampere hour capacity. (Ampere hours equal watt hours divided by volts, hence the ampere hours required equals 10,325 watt hours divided by 32 volts or 323 ampere hours.) Battery manufacturers' catalogs give ampere hour capacities of various sized cells.

By following this procedure, the purchaser can effect economies which will be reflected in multiple since future purchases of batteries for given applications will be based on original computations.

[1] Supervisor Field Engineering, Gould-National Batteries, Inc., Trenton 7, N. J.
Formulas used are from the Handbook of Material Handling published by the Electric Industrial Truck Assn., 1950.

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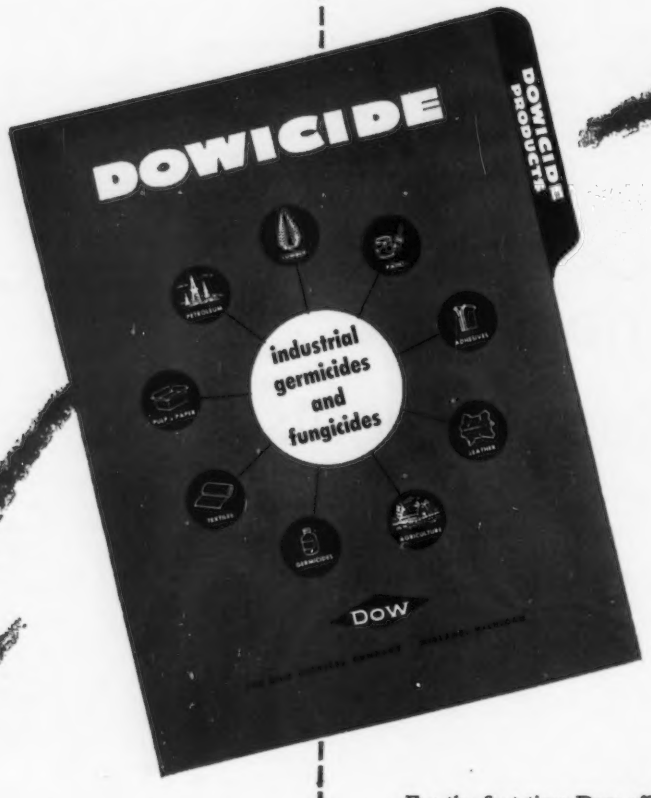

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A Study of the Structure of Paper by Means of "Soft" X-Rays

J. D. Pelgroms

Chemical Engineer, Chief of Control and Research
Laboratories of Papeteries Steinbach & Cie., Malmedy, Belgium

This study was made under the auspices of the Belgian Institute for the Encouragement of Scientific research in industry and agriculture. Translation from the French by Mr. William Freund, manager Foreign Dept., Paper Corp. of United States

Introduction

One of the factors which determines the physical resistance of paper, is the manner in which the fibres are matted during the formation of the sheet on the wire of the paper machine. Another important factor is the length of the fibre as well as the filler content of the finished paper. The length of the fibre may be determined by measurement under a microscope.

Every paper chemist knows how to determine the quantity and the kind of filler. However, insofar as we know, there is no method after felting, to show the pattern of the fibres in the finished sheet.

Frequently attempts are made to photograph paper in transparent light. Several strips of paper are exposed for different lengths of time, but the pictures obtained, give only a vague idea of the construction of the paper and its opacity.

We have sought a method to determine positions occupied by fibres in the finished paper. The following study will indicate to what extent we have succeeded up to the present time.

We must admit at once that the method which we propose is not suitable for a regular production control, since the necessary apparatus is too expensive and the process is too cumbersome. However, in the hands of the research worker it may provide an interesting and useful tool for examining the secrets of felting, and as such it is neither costlier nor more complicated than other processes.

Let us consider some of the work done in the past on this problem.

Historical Data

In 1936 Dr. P. Lamarque, professor of medicine at the University of Montpellier, published a study under the title "The Technique of Historadiography." *(1)* That is the first publication we know of which deals with the use of x-rays with low tension, so-called "soft" rays. In 1944 Fournier & Perrot tried to improve the method. *(2)*

At that time Lamarque was familiar with the works of Dauvillers. This author worked on this problem in 1930. at which time he was endeavoring to arrive at a method for x-ray photomicrography of the cells of elder pith. The method adopted by Lamarque may be described as follows:

A thin layer of tissue, mounted in paraffin and washed with xylol, is pasted on a photographic plate or film. The photo sensitive layer is an emulsion of the Lippmann type, especially prepared for this purpose by Photo-Products Gevaert, S.A., of Mortsel, Belgium. The film with the tissue layer is placed in a dark chamber, mounted on an x-ray tube, and centered automatically on the axis of the beam. A system of pumps assures a vaccum in the dark chamber. A very thin aluminum screen protects the film from the cathode rays. Later on this screen was replaced by a thin sheet of lithium whose very low atomic weight made it possible to work with even softer rays.

The tube itself is detachable, with a tungsten anode cooled by circulating cold water. The cathode is cooled by air.

The oil vapor diffusion pumps produce a vacuum of .000001 mm of mercury. This vacuum was obtained within 20-25 minutes after starting the pumps. This complicated system, after each exposure, necessitates a complete stoppage interval of about a half hour, so as to permit the apparatus to become cool again.

Lamarque obtained radiographs of histological layers by exposing them for not more than five minutes under a tension 5 Kv and with 80 mA. At the time he felt that there should be a means of lowering the tension and thus to work with less penetration, and to arrive at better results.

This is the method which, since the end of 1945, seemed to us to be the one indicated in order to obtain photographs of paper by "radiography."

However, when transposing the known factors of the Lamarque process into the realm of paper, we did no lose sight of the fact that paper necessarily presents, if nothing else, a higher degree of absorption than a histological layer.

Furthermore, the entire construction of the tube employed by Lamarque envisaged the production of rays as soft as possible, and it appeared to us greatly subject to chance whether the paper fibres (a substance necessarily thicker and denser than the histological layer) could be subjected to radiography.

We have requested the advice of Prof. Lamarque who, with great kindness has given us valuable suggestions. We have learned during this exchange of correspondence that Lamarque had tried to make radiographs of cigarette paper, and even of thin writing paper. His pictures did not appear to us to be very distinct. They were not clear enough and did not have enough contrasts.

We therefore decided to construct an apparatus ourselves. We planned to find a set-up which would not require the vacuum between the tube and the dark chamber and without further increasing the time of exposure in view of the number of pictures to be taken. Furthermore, it was necessary to radiograph a surface sufficiently large to obtain a true picture, keeping in mind the irregularities of certain papers visible in the look-through.

On the other hand, we could start by taking advantage of certain factors: In the first place, it was not necessary to prepare the object of examination (as in histology) and to paste it on the film, which is a delicate operation and frequently damages the sensitive coating on the plate.

Furthermore, the kind of sensitive film was known and was used successfully by Lamarque, particularly the Lippmann emulsion which has the correct degree of sensitivity and has an exceedingly fine grain. This offered a double advantage—simpler construction of the dark chamber and enlargement of the picture without showing grain.

Based on the above, we requested Usines Balteau S.A., 91 Rue de Serbie, Liege, to study the set-up with us. We must express our thanks to Mr. H. Bare, chief engineer of this company, and Mr. O. Halleux, physicist, his assistant, for their splendid cooperation.

Their description of the equipment follows.

Apparatus

The slight difference in opacity for x-rays between the different layers of the samples, requires the use of very soft rays. Unfortunately, these soft rays are very quickly absorbed, and it is hardly possible to work with a normal x-ray tube the window of which is either glass or aluminum. For this reason Prof. Lamarque has used a detachable tube, and has placed the samples and the film in its interior. This was made possible by the appearance on the market of sealed tubes with windows of beryllium. The beryllium permits a substantial part of the soft x-rays to penetrate, and it is really not opaque except for rays of more than 4.2A°, while pyrex glass is opaque to all rays of more than 1.4A°. It therefore became possible to work with a sealed tube with voltages of 5, 4, or even 3Kv. This latter voltage is the lowest limit possible, because the shortest rays which can thus be produced are 4.11A° for 3Kv, and as we have stated above, the softest possible rays would be 4.2A°. In order to work with a practical exposure time, it would be necessary to utilize at least 3 Kv.

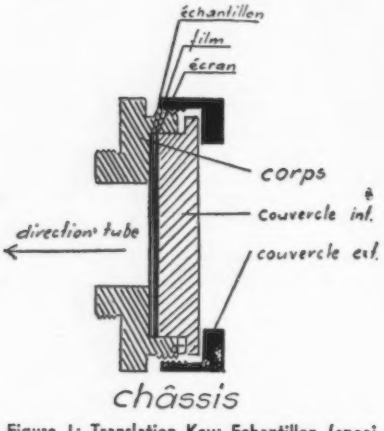


Figure 1: Translation Key: Echantillon (specimen); Ecran (screen); Corps (body); Couvercle int. (inner cover); Courvercle ext. (outer cover); Chassis (frame).

With this voltage we do not have the same contrast as Prof. Lamarque, since he works with 2 Kv. However, the picture obtained is distinct and we obtained a picture every 15 minutes, which performance can be maintained with regularity for successive days.

We used a Machlett tube of the type A.E.G. 50A with focal length of 1.5 mm. The diameter of the beryllium window is 20 mm. This tube has made it possible to simplify the dark chamber, or better still, to replace it by an exceedingly simple carrier *(Figure 1)*.

The distance of the film from the window is 25 mm,—from the film to the center of the tube 43.5 mm,—the diameter of the picture obtained is 25 mm. The tube is part of a unit of microradiography called "micrographix" which is composed of a high tension generator with built in transformer for heating of the filament.

Control is obtained with voltage regulators acting on the primaries of the high voltage and heating transformers, thus providing continuous variation from 0–25 KV maximum high voltage, and 0–35 MA output.

This apparatus is also protected by safety devices which prevent any false handling on the part of the operator, and also makes it possible to entrust the supervision of the operations to any careful man in the laboratory. For instance, the tube which has to be cooled by a flow of water of at least 2 liters per minute, is protected by a special mechanism which will cut down the high tension the moment the water flow falls below this figure. Furthermore it is impossible to switch on the high voltage unless the filament of the tube has been lit. Test lamps control the temperature of the filament and the high voltage. The entire installation is protected against high voltage.

The initial trials were made at the Laboratory for General Physics at the University of the Liege by Mr. Lambot. This gentleman has written a short article on this in the "Industrie Chimique Belge" *(3)* and later on in the "Bulletin de la Societe Royal des Sciences de Liege." *(4)*

The pictures obtained from this initial trial were, in our opinion, far from satisfactory. Our first results early in 1948, achieved on the final apparatus in our own laboratory, were

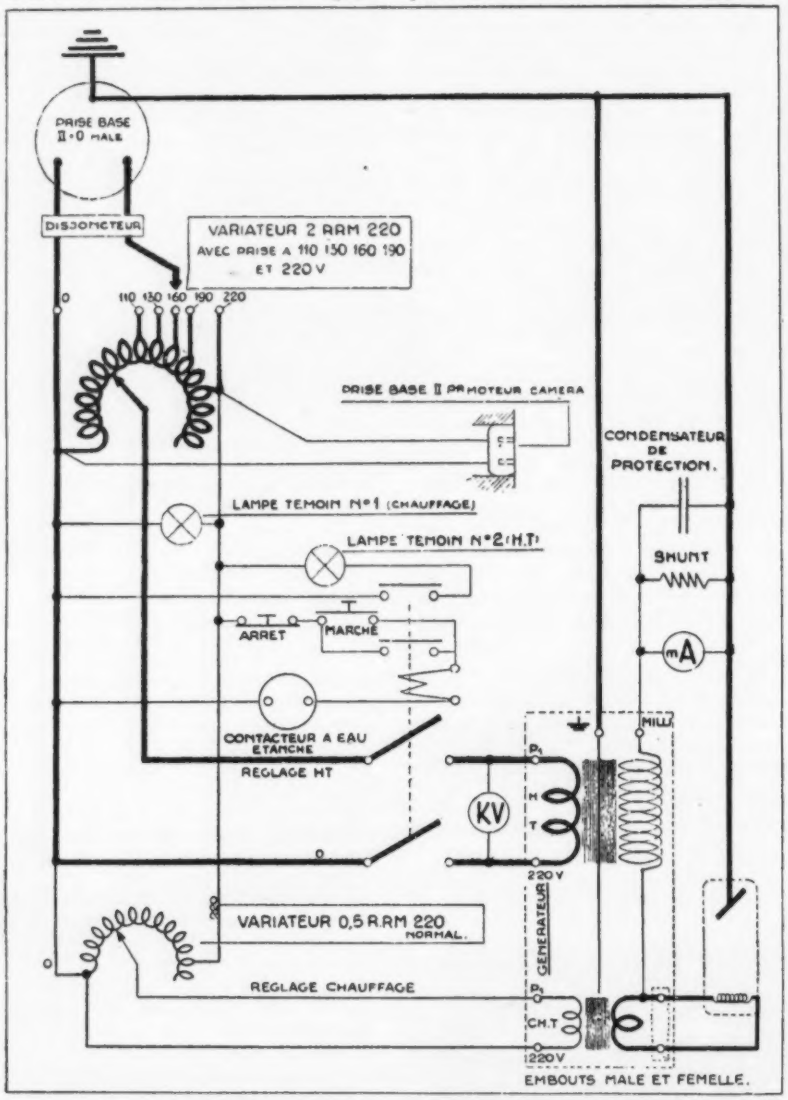
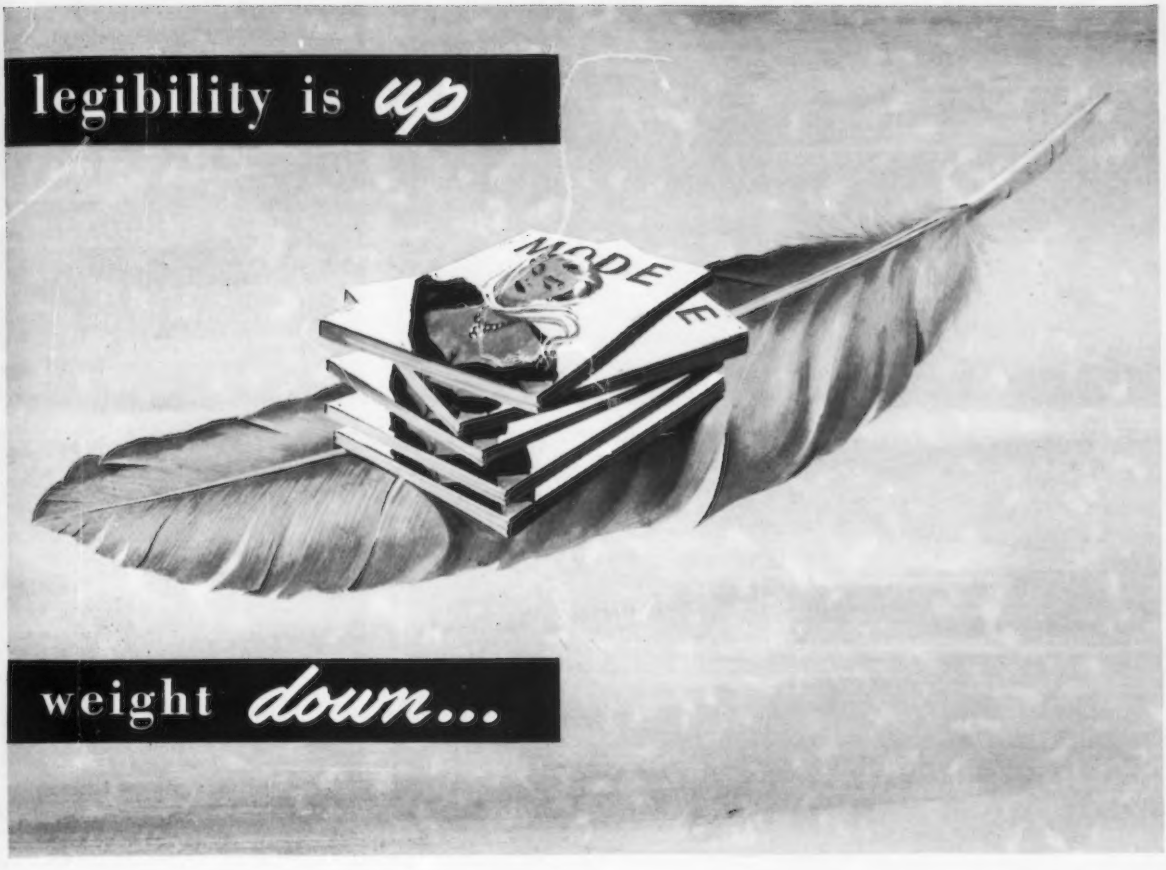


Figure 2: Translation Key: Prise base (basic contact); Disjoncteur (cut-out); Variateur (variator); Prise base moteur camera (basic contact for camera motor); Condensateur de protection (protection condenser); Lampe Temoin No. 1 (chauffage) (pilot lamp, heating); Arret (stop); Marche (start); Generateur (generator); Contacteur a eau etanche (watertight water contactor); Raglage Chauffage (heating regulator); Embouts male et femelle (male and female sleeves).



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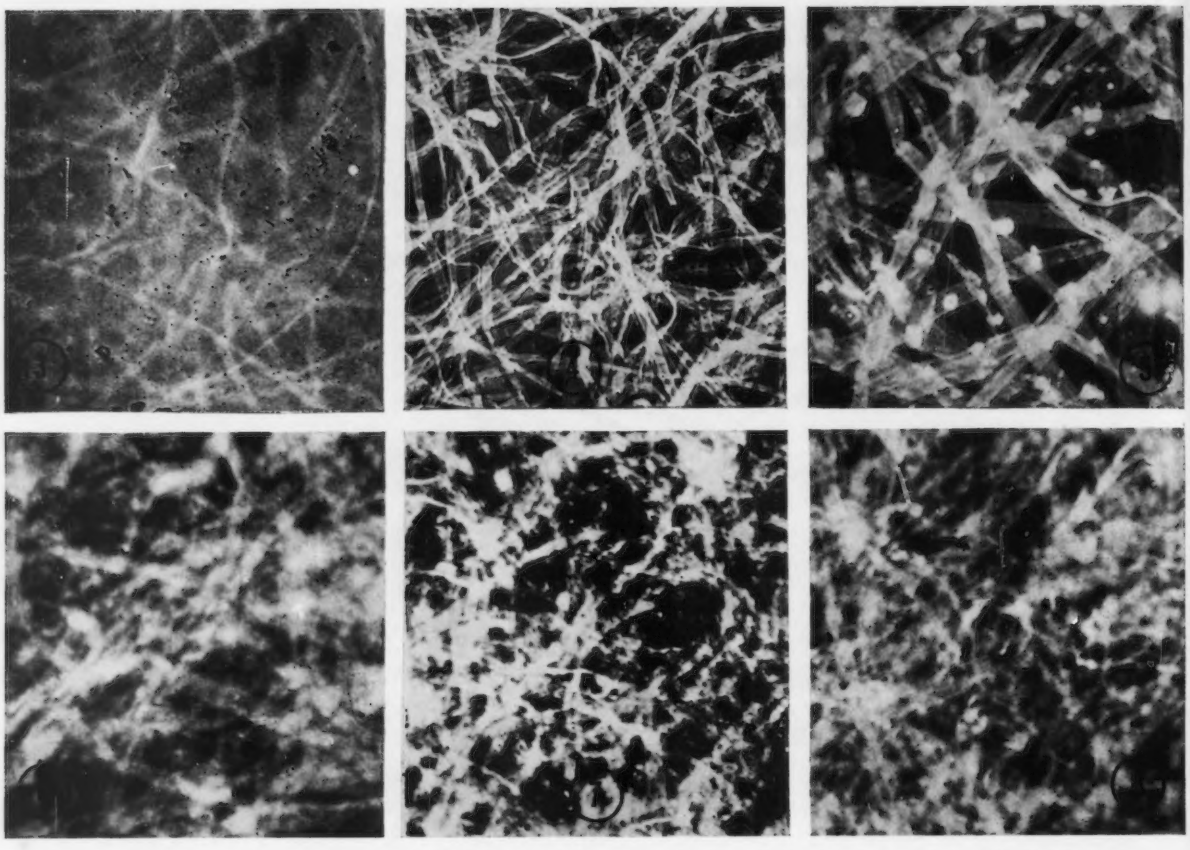

Figure 3: Sheet made on the test sheet machine in the laboratory, 17 grs/m2, pulp from 100% pinewood, refining 15°SR, thickness 25mu, not opacified, 3 Kv, 20 mA, exposure 20 minutes. Picture indistinct—compare with picture No. 2. Figure 4: Same sheet as picture No. 1, however, opacified, 3Kv, 20 mA, exposure 20 minutes. Picture very clear. Evidently there is no question of a characteristic felting because the sheet was made on the test machine in the laboratory, thus, without shaking. Figure 5: Sheet formed on the test machine in the laboratory, 18 grs/m2, pulp from 100% pinewood, refined 15°SR, thickness 28 mu, opacified, 3 Kv, 20 mA, exposure 20 minutes. Observe the crystals of the opacifier. Observe also the number of layers of fibers, probably six. This would confirm the idea usually accepted by paper makers that it requires a minimum of three grams of pulp to form one square meter of paper. Figure 6: Photo base board 240 grs/mA pulp from 100% pinewood, medium refining, thinned down to 80mu, opacified, 6Kv, 20mA, exposure 15 minutes. Observe the formation of "spider webs." Figure 7: Photo base paper 135 grs/m2, pulp from 100% pinewood, more highly refined, thinned down to 40mu, opacified, 4Kv, 20mA, exposure 20 minutes. The "tendons" of the spider web are lost in the mass of fibers which were refined to a high degree. Figure 8: Photo base paper 80 grs/m2, pulp from 100% pinewood, very highly refined, thinned down to 30 mu, opacified, 6Kv, 20mA, exposure 15 minutes, very highly refined. The spider web structure is still visible but submerged in the great mass of short fibers.

hardly better, in fact, they were really rather discouraging.

The Technique

Several modifications of procedure again brought only dull, indistinct, pictures without much contrast. They did show some fibres but there was no trace of a true felting. *Figure 3* shows one of the best. At that time it became obvious that some method for increasing the contrast of the picture must be found. Professor Lamarque worked with fairly transparent sections up to a thickness of 5 mu. The papers used here had thicknesses of 60-350 mu.

When examining pictures on a sheet of exceedingly thin paper made on a sheet machine in our plant laboratory, we were able to obtain a comparatively clear print.

We tried to make a sample as thin as possible, and after much laborious and complicated work we finally achieved a caliper of 30 mu.

The following procedure is now used. The sheet of paper is folded over a piece of glass. Using a piece of smooth wood covered with very fine sandpaper we carefully rub the paper until it has a thickness of about .03 mm. Much care and patience, as well as a certain amount of dexterity are required to produce a paper that is comparatively equal in thickness over a sufficiently large surface area. An apparatus to do this work mechanically, would be highly desirable but unfortunately, as yet, we have not found such equipment.

Pictures obtained from the paper made thinner by this method were somewhat better, but, in our opinion, still not satisfactory.

It became necessary to find an opacifying substance, which has a high degree of affinity for cellulose fibres, without damaging the sensibility of the emulsion. It would take too long and be of insufficient interest, to enumerate all of the opacifying reagents which we tried, particularly those used in medical radiology.

We finally found a very simple and successful method, by staining with an iodine solution. The following procedure is used.

A circular piece, is cut from paper thinned down to .03 mm. The diameter is about 40 mm to fit the carrier describde above. This piece is then treated with the iodine solution of the following formula:

Iodine	5 grs.
Potassium Iodide about	20 grs.*
Ethyl Alcohol	100 cc

*Until Saturation

Simply moistening the paper is not sufficient. The following procedure is required: The paper disc is placed on a piece of glass size 6 x 9 cms. Three drops of the iodine solution are applied on the paper which is immediately thereafter covered with another piece of glass, to prevent too rapid evaporation of the alcohol. After

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HARRY B. HIGGINS
President, Pittsburgh Plate Glass Company

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Payroll Savings—the plan that protects—pays the employer *triple* benefits:

- it makes a good employee a better one—a serious saver with a definite plan for personal security.
- as enrollment on the plan goes to 60%, 70% employee participation, productivity increases, absenteeism decreases and accident records go down.
- and as Mr. Higgins points out, the systematic purchase of Defense Bonds through the Payroll Savings Plan is building a tremendous reserve of purchasing power.

Let's point up the third employer benefit with a few figures:

- On September 30, 1951, individuals held Series E Bonds totaling $34.6 Billion—more than $4.6 greater than on V-J Day.
- During the five calendar years (1946-1950) Defense Bonds sales provided:

—*Cash* to retire $3 Billion A-D Savings Bonds (maturing Series).

—*Cash* to meet $24 Billion redemptions of E, F and G Bonds.

—$6 Billion (after providing cash for the payments enumerated above) that the U.S. Treasury could use to pay off bank-held debt.

And the figures are getting better every day—between January 1, 1951 and November 1, 1951, 1,200,000 employed men and women joined the Payroll Savings Plan.

If the employee participation on your Payroll Savings Plan is less than 60%, phone, wire or write to Savings Bond Division, U.S. Treasury Department, Suite 700, Washington Building, Washington, D.C. Your State Director will be glad to show you how you can participate in the triple benefits of the Payroll Savings Plan.

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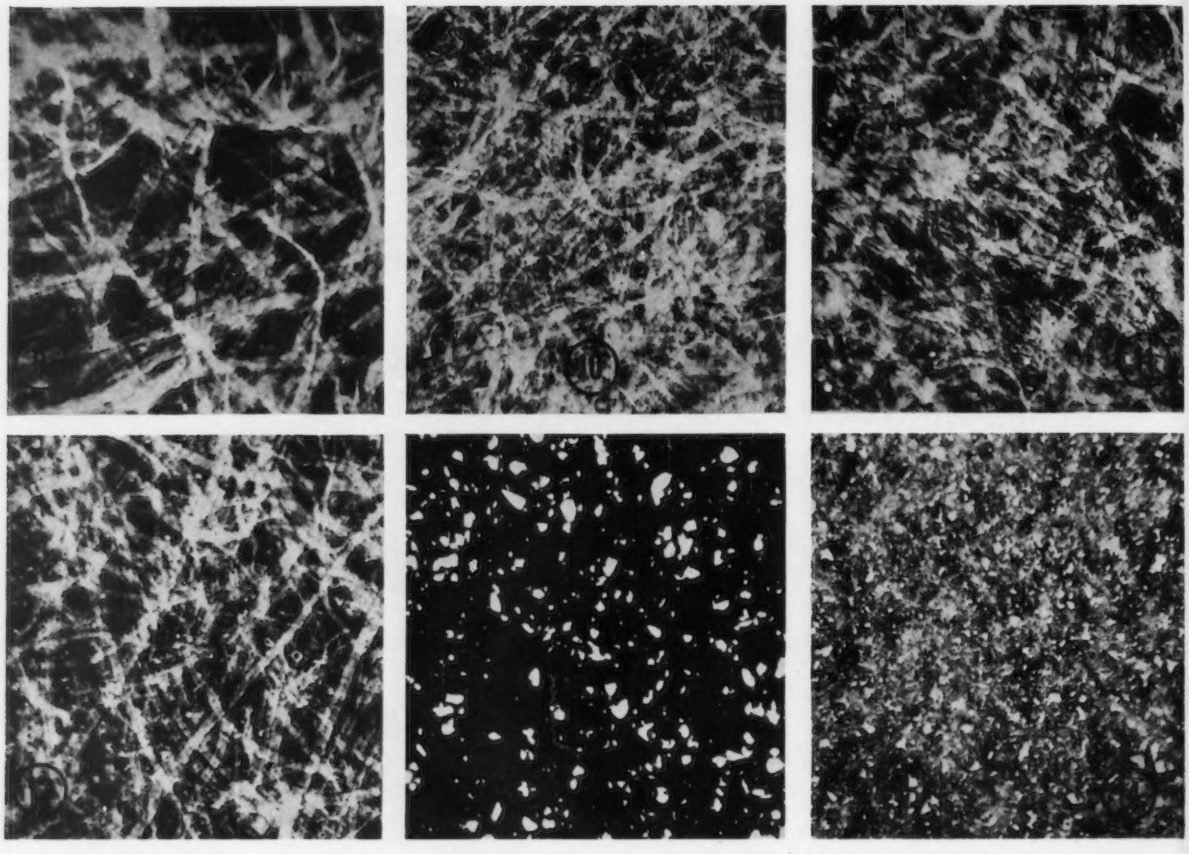

Figure 9: Special cardboard 175 grs/m2, pulp from 100% pinewood, refined 20°SR, thinned down to 50mu. opacified, 6Kv, 20mA, exposure 15 minutes, stock only somewhat refined. Formation of spider web very clear compared with photo No. 8. Figure 10: Same cardboard as No. 7, thinned down to 50 mu, opacified, 6Kv, 20mA, exposure 15 minutes. Picture made after calibration of the cardboard. This operation had reduced the original thickness of the board from 220mu to 180 mu. It can be said that certain fibers in the second or third ground of photo No. 7 now appear on the surface. The spider webs are not visible any more. Figure 11: Diazo base paper 80 grs/m2, slightly glazed (Gurley 380"/100cc) pulp 100% pinewood, very strongly refined, thinned down to 35mu, opacified, 6Kv, 20mA, exposure 15 minutes, short fibre, the center of the spider webs still in appearance, the tendons have disappeared. Figure 12: Writing paper 70 grs/m2, 90% pulp from pinewood, 10% ash, refined 62°SR, thinned down to 30mu, opacified, 6Kv, 20mA, exposure 15 minutes. Very regular matting, no typical design visible. Figure 13: Offset board 240 grs/m2, 310mu, fillers for 100 ks. of dry pulp: 30 ks. kaoline, 6 ks. sulphate of Baryta. The finished paper produced 23.5% ash, not thinned down, not opacified, 7.5Kv, 15mA, exposure 15 minutes. Would it be possible to distinguish the different kinds of filler? There seems to be little hope. Figure 14: The same board as photo No. 11, not thinned down, opacified, 7.5Kv, 15mA, exposure 30 minutes. This is the first attempt to make visible in one picture the fibres and the fillers. The fillers are clearly visible, the white parts with soft outlines probably representing the fibres.

two hours the iodine has fixed on the fibres and the paper is air-dried. Too rapid drying crystallizes the KI and produces a picture *(Figure 5)* which may lead to incorrect interpretations.

In the dark room a disc of fluorescent screen (zinc sulfide) is first placed in the carrier, next the Lippmann film (emulsion towards the tube), and finally the well-dried treated paper. When mounted in this manner, the carrier can, without danger to the sensitive film, be carried in the hollow of the hand, and can be screwed on the tube of the apparatus which should be in a dimly-lit room.

After the cooling water has been circulated, and after the voltage and current have been regulated by the use of indicating meters, the sample is oxposed.

The film is developed in a yellow or pale red light in the following baths:

Developer:

Hydroquinine	15 grs.
Methol	6 grs.
Sodium Carbonate	36 grs.
Sodium Sulphite	30 grs.
Potassium Bromide	1 gr.
Water	1000 cc.

The time for developing is usually three minutes, although Lippmann film easily permits development of seven minutes without danger of fog. The following fixing bath is used:

Sodium Hyposulphite	200 grs.
Sodium Metabisulphite	50 grs.
Water	1000 cc

After drying, the film is examined under the microscope. An enlargement of 50-X is sufficient. This examination will permit forming an idea as to the "value" of the negative.

To be legible, the negative must be sufficiently clear and must have good contrast. It must not be too hard; that is, the details must be clearly visible and of moderate density.

It should be borne in mind that a radiograph should be studied the same as a doctor reads an x-ray of the lungs. At first the interpretation of a negative is somewhat difficult, but after some time it is easy to understand the details.

If the negative is good and of sufficient importance a positive may be made from it. For this we use a photomicrographic camera with bellows (a product of Gamma Instrument Corp., New York), and a flashlight bulb with 8 V overrun bulb (product of Galileo).

For sensitized base we found the Scientia plates made by Gevaert to be very good, particularly because they come in four different grades each one with its own sensitivity and contrast. These plates can be developed and fixed in standard solutions.

The negatives can be used either as negatives for making prints on paper, or they can be projected directly on a screen. Such projection is not only very impressive, but also affords easier

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interpretation of the picture. As a matter of fact, we have been able to project pictures on an enlargement scale of 1000 D, which means that a fibre with a diameter of 50 mu is seen on the screen in 5 cms widths. As shown by the illustrations in this article we believe our goal has been reached. However, it is probable that other opacifiers may be discovered which will eventually lead to better results.

Recently we have heard of some work done in America on textile fibres. The author, *(5)* working with the same kind of tube, points out as a means to opacify the cotton, a solution of lead sulphide. We have since tried this material, but prefer, for the cellulose fibre, our iodine solution.

Although the fibre structure was of primary interest, we did not overlook the mineral fillers in the finished paper.

As stated at the beginning of this report, the quantity and the kind of fillers used in paper making, may easily be determined by analysis. Their distribution in the sheet can be shown, so far as we know, only through radiography. For this the method of operation is much simpler. It is the same as for the fibres, except that it is not necessary to make the paper thinner, or to make it opaque. The fillers are usually mineral substances, and are much more opaque against x-rays than cellulose. It is, thus, sufficient to make the exposure at a higher voltage, provided this is not carried too far. The image of the fibers disappears, and only the picture of the fillers remains.

So far we have not been able to try papers thicker than .25 mm. and these are of less interest. As a matter of fact, they are obtained by pasting two or three sheets, or are made on a machine with two or more cylinders.

It would, of course, be interesting to make pictures showing the fibers and the fillers at the same time. This we think should be possible; merely a question of finding the right technique.

It may seem strange that in the preceding part we have not explained in greater detail the voltage requirements for making the pictures. This is due to the fact that the tube with the beryllium window makes it possible to work with low voltage, and also that the conditions of voltage, current, and exposure time vary with the sample being examined. Usually we make the fiber pictures between 3 and 6 Kv, 15-20 MA and from 5 to 16 minutes. For fillers the corresponding figures are: 7, 5 to 15 Kv, 10-15 MA and 30-60 minutes.

Results

We think that it is possible to study, through microradiography, the felting of the fibers under well determined conditions, as well as the distribution of the fillers.

Practically speaking, in order to derive from this study real benefits applicable to the manufacture of paper, we must study, for instance, the same kind of paper manufactured under similar conditions, with the same furnish and degree of beating, etc., but made on two different paper machines. Such a thing is extremely difficult. Every papermaker knows that the beaters, even of identical construction, do not always produce the same results, that one kind of pulp cannot always be refined to the same degree in each beater of the same type, and that two paper machines of identical shaking, with all conditions identical, will not produce the same qualities of paper.

If one wishes to study for instance, through means of radiography, the difference of shaking between two paper machines, and its effect on the formation of the sheet, it will be necessary to work with these two machines and their respective beaters under exactly identical conditions. This is a project which we hope to tackle in the near future.

We have already mentioned certain structural differences in one kind of paper made on one machine, as compared with the same kind of paper made on another of our machines. Other interesting results have been obtained. However, we first want to have these confirmed by additional trials, before we will consider them as established facts.

Conclusion

As may be seen, this offers an extremely interesting field of study. As soon as the chemist has been able to determine for each of the machines of his industry the proper felting for each grade of paper, he will then have to study the influence of these feltings on the physical and physico-chemical properties of papers, and draw the necessary conclusions.

This also applies to fillers, since it is probable that they will influence the characteristics of the finished product according to their distribution in the sheet of paper.

Photographs

So far, we have made about 500 radiographs, 240 of which have turned out satisfactorily. This high percentage of failures can be explained by the difficulties encountered at the outset. Included herein are twelve photos which seem to us to be best suited to illustrate our results.

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World's Largest Anthracite Boiler Being Built

The world's largest anthracite coal-fired steam electric generator is now being manufactured by the Foster Wheeler Corp., at its Carteret, N.2J., and Dansville, N. Y., plants, and will be erected at the Holtwood, Pa., hydro-electric and steam generating plant of the Pennsylvania Water & Power Co.

Although the turbine generator will have an official rating of 66,000 kilowatts, it is expected that ultimate capacity will be closer to 75,000 kw.

Bituminous coal or oil are the fuels used in the vast majority of the nation's steam generating plants with a comparative few using anthracite for their boilers. Penn Water's operation is unique. The Susquehanna River, on which its hydro plant is located, flows through the Pennsylvania anthracite fields 150 miles above Holtwood. Over the years this stream has brought millions of tons of coal, in the form of tiny particles about the size of a pin head, down stream. Pennsylvania Water & Power Co. "mines" this coal from the bottom of Lake Aldred, behind the Holtwood dam and Lake Clarke, behind the Safe Harbor Water Power Corporation's dam eight miles upstream from Holtwood. The silt deposits — part sand and loam and part fine coal particles — are recovered and the coal separated from the waste, and then pulverized and burned in its steam plant. Cost of this "river coal" will be considerably lower than that of bituminous coal or other available fuels purchased on the open market.

The new Foster Wheeler unit comprises a "furnace" which, when erected, will stand 100 feet high, or about the height of a ten story building. Its interior will contain some 96,000 cubic feet, or sufficient to contain over four normal-size homes. Into it, each hour, will go 46.6 tons of the "river coal" or a total of 1118 each day.

As a part of the preparation of this coal for use in the unit, Foster Wheeler will install four ball mill pulverizers, each 10 feet in diameter and each driven by a 600 horsepower motor, the four designed to pulverize 56 tons of the "river coal" every hour to about the consistency of talcum powder. This talc-like coal is blown into the furnace where it is ignited and mixed with pre-heated air and passes into the boiler.

Here the hot gases pass over 22.4 miles of water and steam filled tubes to produce 700,000 pounds of steam per hour at 945 p.s.i. and 905°F.

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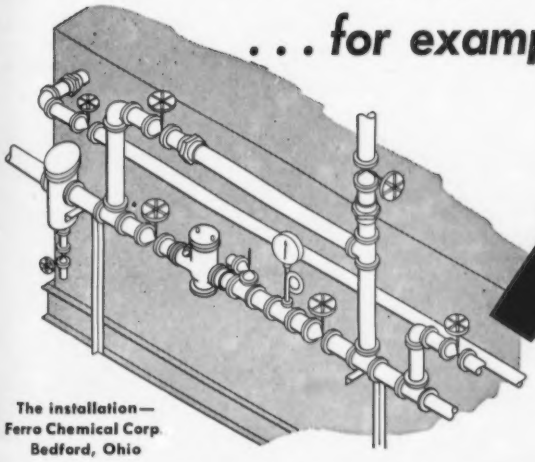

The installation—
Ferro Chemical Corp.
Bedford, Ohio

PROBLEM: To maintain automatically, within close limits, uniform reduced steam pressure from supply line to battery of two drying ovens controlled by individual thermostatic valves.

WORKING CONDITIONS: Initial steam pressure of 70 psi to be reduced to 13 psi, and maintained without significant fluctuation whether one, both, or neither of the ovens is being operated.

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AccuRay Beta Gauge

Designed specifically for continuous measurement of sheet material produced in the rubber, plastic, and paper industries, the AccuRay Beta Gauge, Model R, is announced.

Basically, the gauge consists of a beta radiation source below the sheet to be measured and, above it, a detector to measure the amount of radiation

Two Model R AccuRay gauges allow simultaneous measurement on each side of the sheet, providing the calender operator with information to control tolerance to an accuracy heretofore impossible. The gauges also are positioned automatically across sheet to measure the entire sheet width and present a profile picture of the calender rolls.

that penetrates the sheet, plus a recorder to present this information in terms of weight per unit area.

Like the original Model BG-1 Beta Ray Gauge introduced earlier this year, Model R is a non-contacting radiation gauge that provides readings *directly* in square yard weight with a continuous accuracy of ± 1 percent.

New features include an automatic control for positioning the measuring unit across sheet to provide profile readings and a control for the selection of desired weight ranges; a remote control station with repeat meter which permits the calender operator to read and control the gauge from a distant point.

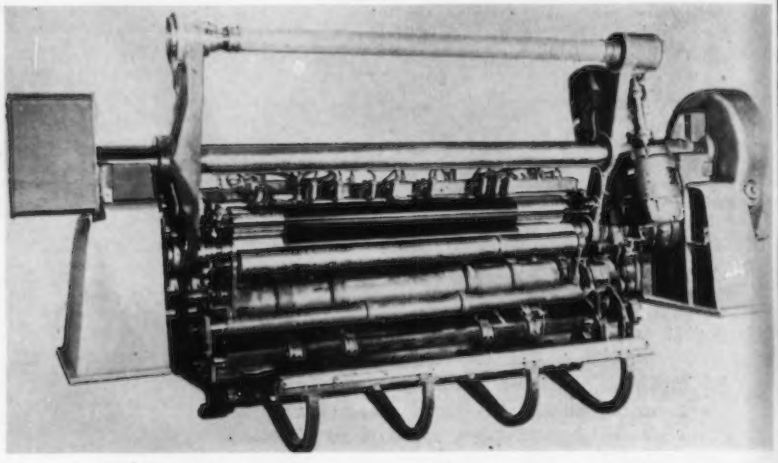
A further aid to the operator is the recorder which can be equipped with target and tolerance marking pens to provide a comprehensive working picture at a glance. Also available are chart-marking pens for recording the weight range and the sheet position of the AccuRay which supplies management with a permanent record for each roll of processed material.

Measuring unit is produced in size to permit measurements up to 24, 36, 48, and 60 inches from the edge of the sheet. The gauge is said to be insensitive to temperature variations, line voltage fluctuations, dirt, moisture, shock and vibration, and to require no recalibration.

Write Industrial Nucleonics Corp., 1205 Chesapeake Ave., Columbus 12, Ohio.

Plastic Winder

The new continuous automatic winder is specially suited to winding of web materials which must be wound with extremely low tension values, materials such as plastic film and sheeting as produced continuously from calenders, extruders and coating equipment.



Produced as the result of more than a year's trial on commercial scale experimental equipment utilizing films and sheeting of most calipers and formulations, the winder consists of a rotatable, center wind, two-arm reel, with separate motors driving the winding core or shell through ball bearing spindles. Separate driving motors are of the DC variable-voltage type and are furnished with the winder as an integral part of the complete unit. Winder drive is suitable for addition to any existing take-off and does not require an alteration of the basic calender or take-off drive previously installed, it is stated. Degree of tension and winding operation is controlled by means of speed adjustment of the winding core. Winding is done on cores or shells of 3″ to 9″ in diameter, and two diameters may be used alternately by means of a remote control selector switch. The same basic Model 40 reel is used for the winding of both film and sheeting.

In the Model 40, slitters are incorporated in the winder close to the roll being wound. With the slitters in this position, very straight edges are maintained and it is possible to slit into several widths, the manufacturer claims.

Tension is said to be constant, positive, and automatic, and to require no attention from the operator once the desired tension is set. Even and uniform starts are made and require no adhesive or special processing of core or shell, it is said. The flying-start mechanism changes from a fully-wound roll to a new core or shell automatically without slowing down the process.

Range of duty legend for Model 40 is: maximum roll diameter 24″; maximum web or ribbon width 84″; maximum roll weight 1000 pounds; maximum speed 510 f.p.m.; total web tension range 2 to 60 pounds.

Write to Dilts Machine Works, Fulton, N. Y. for bulletins DK-28 and DK-29.

Automatic Tension Control

The new automatic tension control system embodies constant speed and constant tension control on web or filament winds or unwinds. The device can be used, the manufacturer states, as an attachment in conjunction with any machine which possesses a continuous web or filament. Applications include papermaking, printing, coating, laminating, etc.

The system is suitable for high or low speed operation, tensions being adjustable from 0 to several pounds per inch of web-width. Suitable sizes of the device are available for tensions requiring torques up to 1800 foot pounds. If operated at near zero tension, it becomes a so-called "tensionless drive." For higher torques, the company has designed special units and is ready to quote. The unit will maintain constant lineal speed regardless of the size of the roll being wound or unwound as the case may be, it is claimed. Special units for explosion

(Continued on page 38)

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Rolls, contract, per ton $114.00/116.00
Sheets ..... 130.00/ —

Kraft—per cwt. 50# base wgt. OPS Ceiling CPR 88

F.o.b. Southern & Western integrated mills. C.l. Freight allowed up to $10 a ton.

Standard Wrapping, ctr. rolls ..	$7.75/ —
Butchers, counter rolls	8.25/ —
Standard Bag, mill rolls	7.50/ —
Shipping Sack, mill rolls	7.75/ —
Gumming, mill rolls	8.00/ —
Asphalting, mill rolls	7.75/ —
Envelope, Sub. 20, mill rolls	9.25/ —

Tissues— per ream 24x36 (480) 10 lbs. 2500 lbs or more

Wh. No. 1 Frd.	$2.25 /$2.40
Wh. No. 1 MG	2.25 / 2.40
Wh. No. 1½	1.95 / 2.05
Wh. No. 2	1.75 / 2.00
Kraft Anti-Tar 20x30	2.12 / 2.25
White Anti-Tar 20x30	2.20 / —

Toilet— per case of 100 rolls—1M sheets

Unbleached 4½x4½	$8.00/$8.25
Unbleached 4½x5, 650 sheets	6.65/ —
Bleached 4½x4½	10.00/12.50
Bleached 4½x5	9.96/ —
Per Case of 50 rolls—2000 sheets	
Unbleached 4½x4½	$8.00/$9.75
Bleached 4½x4½	6.95/ —
Per Case of 100 rolls—1000 sheets	
Facial, 4½x4½, 2-ply	$8.95/10.37
4½x5, 2-ply	10.25/10.75

Paper Towels— per case of 3750

Wh. Jr. M'tif'd 9⅛x9½	$6.40
Br. Sr. M'tif'd 9⅛x12	4.40
Br. Jr. M'tif'd 9½x9⅞	3.90
Br. Jr. Sgl. fold 9⅞x10¾	3.95
C-Fold 10¼ min. x 14 max.....	$5.90/$6.64
Blchd. 7½x11, 48/50 rolls	$6.80/$7.92

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Sulfate, Bleached	145.90/ —	190.00/200.00	$230.00/ —	$230.00/ —	$230.00/ —
Semi-bleached Sulfate ..	140.00/ —				
Sulfate, Unbl.	132.50/ —	145.00/175.00	200.00/ —	200.00/ —	
Sulfite, Blchd.	140.00/ —	160.00/175.00	225.00/ —	225.00/ —	225.00/ —
Sulfite, Unblchd.	132.50/ —	150.00/160.00	200.00/ —	200.00/ —	
Sulfite, Unbl'd (Glassine)		164.00/ —			
Soda, Blchd.	140.00/ —	155.00/160.00			
Sulfite Screenings	72.50/ —				
Sulfate Screenings	67.50/ —				
Groundwod Screenings ..	60.00/ —				
Unblchd Sulfate Sideruns	132.50/ —				
Stand. News. Sideruns..	92.50/ —	106.00 —			

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Filled News	$110.00/ —
Plain Chip	105.00/ —
Blchd. Mla. L-d. Chip	150.00/ —
White Pat. coated .020	175.00/ —
Kraft Liners 42 lb. per M sq. ft.	2.47/ —
Kraft Corr. .009 per M sq. ft..	1.59/ —
Binders Boards	137.50/140.00

The following prices are representative distributors' resale prices:

Rag Content Bonds and Ledgers—
White, 20 lb.

Bonds	4 Ctns. per cwt.
100% Rag Ex. No. 1	$70.45/$75.90
100% Rag	62.65/ —
75% Rag	48.15/ —
50% Rag	38.90/ —
25% Rag	31.65/ 33.00

Ledgers	4 Ctns. per cwt.
100% Rag Ex. No. 1	$72.65/$72.80
100% Rag	63.90/ —
75% Rag	49.40/ —
50% Rag	40.20/ —
25% Rag	33.00/ 34.30

Sulphite Bonds and Ledgers
White, 20 lb.

Bonds	4 Ctns. per cwt.
Watermarked	$19.00/$20.50
Plain	18.40/ 19.50

Ledgers	4 Ctns. per cwt.
Watermarked	$20.30/$21.80
Plain	19.35/ 20.80

White Book

Conversion Coated	Case per cwt.
No. 1	$23.90/$24.65
No. 2	22.15/ 23.40
No. 3	21.90/ 22.40
Machine Coated	
No. 1	$18.40/$18.90
No. 2	16.65/ 16.90
Uncoated	
No. 1 Antique (Watermarked)...	$18.65/$19.65
Offset	18.65/ 19.90
A Grade E. F.	18.10/ 19.90
A Grade S. C.	18.65/ 19.40
B Grade E. F.	18.40/ —
B Grade S. C.	17.40/ 19.15

‡ Indicates a price change.

WASTE PAPER MARKET

Prices to mills, per ton, f.o.b. cars shipping point (includes brokers' fee.) These quotations are a partial indication of the price range in each market on the date specified, as gathered from major dealers. ALL PRICES ARE STRICTLY NOMINAL.

	New York Dec. 6	Philadelphia Dec. 10	Boston Dec. 7	Chicago Dec. 3
No. 1 Mixed Paper	nominal	nominal	$10.00/ —	$10.00/ —
No. 1 News	12.00/ 14.00	11.00/ —	12.00/ 13.00	15.00/ —
Over-issue News	15.00/ 18.00	12.00/ 14.00	15.00/ 22.00	18.00/ —
Mill Wrappers (Sulfite)	13.00/ —	10.00/ —	12.00/ —	15.00/ —
Corrugated Containers	15.00/ —	12.00/ 14.00	15.00/ 15.50	15.00/ —
Double Kraft Ld. Corr. Cuts ...	35.00/ 57.50	35.00/ 50.00	40.00/ 57.50	50.00/ 57.50
100% Kraft Corr. Cuts	60.00/ 80.00	75.00/ 80.00	75.00/ 80.00	85.00/ —
Used Sugar & Flour Bags	45.00/ 50.00	35.00/ 50.00	45.00/ 46.50	40.00/ —
Super Resorted Br. Kraft	60.00/ 70.00	45.00/ 55.00	45.00/ 60.00	40.00/ —
New Br. Kraft Env. Cuts	115.00/125.00	100.00/ —	100.00/125.00	100.00/ —
New Br. Kraft Cuts	105.00/115.00	95.00/ —	85.00/105.00	90.00/ —
No. 1 Gdwd Shvs.	35.00/ 45.00	30.00/ 40.00	33.00/ 40.00	30.00/ —
White Newsblanks	60.00/ 70.00	60.00/ 70.00	55.00/ 75.00	50.00/ —
No. 1 Flyleaf Shvs.	35.00/ 60.00	45.00/ 50.00	45.00/ 70.00	60.00/ —
No. 1 Soft Wht. Shvs.	125.00/140.00	110.00/ —	125.00/145.00	125.00/ —
Super Soft Wht. Shvs.	160.00/165.00	— / —	140.00/165.00	135.00/ —
Hd. Wht. Shvs.	160.00/170.00	145.00/155.00	150.00/175.00	140.00/ —
Hd. Wht. Env. Cuts	165.00/175.00	170.00/175.00	175.00/190.00	150.00/ —
New Manila Env. Cuts	100.00/120.00	95.00/110.00	110.00/125.00	65.00/ —
Col. Tab Cards	80.00/ 85.00	70.00/ 75.00	80.00/ 95.00	85.00/ —
Manila Tab Cards	110.00/120.00	100.00/110.00	120.00/130.00	100.00/ —
No. 1 Mixed Ledger	75.00/ 80.00	70.00/ 75.00	67.00/ 95.00	85.00/ —
White Ledger	100.00/110.00	95.00/105.00	100.00/110.00	100.00/ —
No. 1 Book & Mag.†	33.00/ 37.00	22.00/ 24.00	29.00/ 32.00	25.00/ —
No. 1 Rep'd. Hvy. Books‡	43.00/ 50.00	30.00/ 32.00	45.00/ 57.00	40.00/ —

† Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% groundwood. § Deld.

RAG MARKET

New Domestic Cotton Cuttings
OPS Ceiling Price, CPR 28
Delivered Mill Basis

Add 7½% Dealer Commission

No. 1 White Shirts	$21.00
No. 1 Unblchd. Muslins	21.00
Blchd. & Unblchd. Underwears	21.00
Blchd. Canton Flannels	21.00
No. 1 Light Silesias	16.00
No. 1 Light Prints	11.50
No. 1 Blue Overalls	14.50
Suntan Khakis	11.50

Add 10% Dealer Commission

Fancy Shirts	$10.00
Indigo Blues	10.00
Mixed Khakis	8.00
Corduroys	8.00
Cottonades	8.00
No. 1 Washables	6.50

Old Domestic Cotton Rags
(Prices to Dealers, F.o.b. Ship. Pt.)

	Per 100 lbs.
Mixed White	$6.00/$6.50
Cotton Pants & Overalls	6.50/ 6.75
Thirds and Blues, Repacked	5.00/ 5.50
No. 1 Roofing Rags	1.20/ 1.25
No. 2 Roofing Rags	1.00/ 1.10
No. 3 & 4 Roofing Rags	.90/ 1.00

Bagging
(Prices to Dealers, f.o.b. N. Y.)
PRICES NOMINAL

	Per 100 lbs.
Foreign Gunny	$5.50/$6.75
Domestic Gunny, No. 1	5.50/ 6.25
Heavy Wool Tares	5.50/ 6.00
Foreign Manila Rope	9.00/ 9.25
Domestic Manila Rope	9.00/ 9.25
Jute Strings	6.00/ 6.50
No. 1 Sisal Strings	8.50/ 8.75
Paper Mill Tares	5.25/ 5.50
Foreign Scrap Burlap	4.75/ 5.25
Domestic Scrap Burlap	5.50/ 6.00
Austr. Wool Pouches	7.50/ 8.00
New Burlap Cuttings	7.00/ 7.50

MATERIAL PRICES

Aluminum sulfate:
- coml. bags, wks..... ...cwt. 1.65
- iron-free, c.l. 3.25

Alcohol, ethyl:
- tax free, dms. c.l.....gal. 1.01 / 1.05½
  deld. East Miss.

Alcohol, methyl:
- Synthetic, Zone 1, dms.
  c.l. fit. alld.....gal. .44

Casein, acid prec.:
- dom. sh. pt. c.l. .....lb. .33 / .41½
- imp. ex. dock .....lb. .21 / .36

Caustic soda:
- c.l. wks. solid, 76% cwt..... 3.35
- flak. & grd. 100-lb. drums... 3.75
- liquid 50% tanks.... 2.55
- liquid 70% tanks.... 2.65

China clay:
- dom. air-float. c.l. wks.
  ton 10.00
- water-washed, lump, filler.... 11.00
- coating ..... 17.60 /30.50
- imported, ex whse...short ton 15.20 /28.35

Chlorine:
- single-unit tanks, works..cwt. 2.70
- multi-unit .....cwt. 3.20 / 4.40

Formaldehyde:
- USP, inh. dms, c.l. wks....lb. .0625/ .0675
- l.c.l., E. wks..... .0675/ .0725

Fuel oil:
- Bunker C, No. 6 Cal. hvy.
  tanks, refinery .....bbl. 1.95 / 2.15
- light .....bbl. 2.00 / 2.25

Hydrogen peroxide:
- USP, 35% cbys. E. of Miss. lb. .23½/ .26½

Lime:
- hydrated, bags, wks. .....tons 13.50

Rosin:
- B gum, drms, c.l. Savan..cwt. 7.00 / 9.08*
- G, H, I, K .....cwt. 8.05 / 9.49*
- FF, wood, do.....cwt. 6.80 / 7.30*

*OPS Ceiling, CPR 52.

Rosin size:
- 70%, gum & pale grds, tank
  cars, south, sh. pt. ....cwt. 7.50 / 7.60

Salt cake:
- dom. bulk, c.l. wks.....ton 17.00
- wks. frt. all.....ton 20.00 /22.00

Soda ash:
- light, 58%, bags, wks..... 1.50
- bulk .....cwt. 1.20

Sodium slicate, 40°:
- turbid. c.l. wks.....cwt. 1.30 /
- l.c.l. wks. ..... 1.60 / 1.85

Sodium peroxide:
- drms. c.l. E. of Miss.....lb. .21
- l.c.l. do. .....lb. .21½/ .22

Soybean, protein:
- chem. isol, wks, c.l.....lb. .24 / .28
  Cinn. and Chic.

Sulfuric acid:
- 60° Be. cbys. c.l. wks.....cwt. 1.75 / —
- l.c.l. wks. .....cwt. 2.05 / 2.85

Sulfur:
- crude, c.l. mines, contract,
  long ton 21.00 /22.00
- f.o.b. vessels Gulf ..... 22.50 /23.50

Sulfur dioxide:
- liquid, coml. cyl. wks.....lb. .09
- multi-unit cars .....lb. .0535

Starches:
- pearl corn, bags, c.l. wks..cwt. 6.34 / —
- white dextrines, c.l. wks...cwt. 7.73 / —
- potato, Idaho, c.l. wks....cwt. 6.50 / —
- potato, Maine, c.l. wks....cwt. nominal
- tapioca, conv. dextrines...cwt. 6.75 / 8.00

Talc:
- domestic, 50-lb. sacks, c.l.
  wks. .....ton 25.00 /30.00

Titanium dioxide:
- anastase, c|l| deld., bags...lb. .21 / .21½
- l.c.l. deld. .....lb. .22 / .22½
- rutile, c.l. deld.....lb. .23 / .23½
- l.c.l. deld. .....lb. .24 / .24½

10
NASH VACUUM PUMPS
are simple
One moving part. No valves, no pistons, no sliding vanes, no internal lubrication. This makes possible important operating advantages no other type pump offers.
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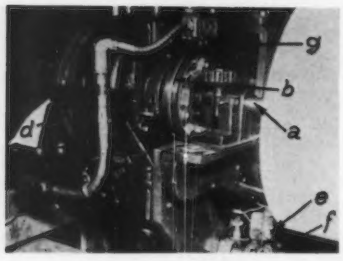
NASH ENGINEERING COMPANY
415 WILSON AVE., SO. NORWALK, CONN

proof applications in hazardous locations can be furnished subject to insurance underwriters approval.

For full information write to Cad-



a.—Web Shaft; b.—Collector Ring; c.—Oil Immersed Magnetic Clutch; d.—Drive from Parent Machine; e.—Dancer Roll Limit Switch; f.—Dancer Roll Fulcrum; g.—Collector Brushes.

gene Machinery Co., Inc., 75 McLean Blvd., Paterson, N. J.

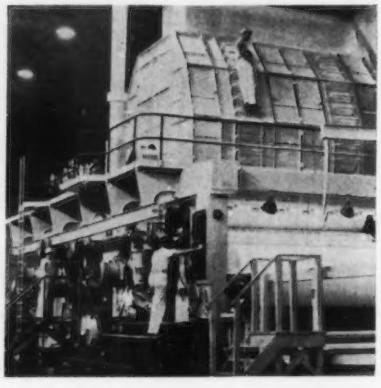
Super Plywood

Cellulose fibre has teamed up with plywood and plastic to form a new "super-plywood."

Called GPX and manufactured by Georgia-Pacific Plywood Co., Augusta, Ga. it is gaining wide acceptance in paper-making mills because of unique features held by the maker to be superior to the best grade of ordinary plywood.

These features include: a plastic surface resembling fine light furniture that does not require painting; satin-smooth plastic surfaces which minimize grain raise; tremendous abrasion resistance which is claimed to be 30 times greater than ordinary plywood; acid and organic solvent resistance; moisture impermeablity to (20/25 times more resistant to water absorption than ordinary plywood); easy-to-clean surface; extra durability.

Because of these properties GPX has replaced lumber, plywood, hardboard and metals in many applications. In paper plants, for instance, the plastic-faced plywood is now used extensively for catwalks, cutting tables, layoff tables, salt solution boxes, ducts,



laboratory table tops, flooring and elevated walks, where it has conclusively proved itself to be superior to the materials it replaced.

Dry Photocopies

Known as Auto-Stat, the new machine produces dry photocopies without developing, fixing, washing and drying methods of conventional photocopy methods. Based on a new principle of instant and automatic developing and fixing, it is designed to produce clear, black and white photo-exact copies of any original in any office.

A compact unit, the machine can be operated on part of a desk top; requires no dark room, no special running water set-up, no exhaust pipes, and creates no ammonia fumes, it is stated. Regardless of whether the original is printed on one or both sides or on opaque or translucent paper, Auto-Stat copies can be made, thus

eliminating the necessity of making intermediate copies of opaque originals.

Using two steps, the manufacturer claims a finished copy can be made in less than 30 seconds. The unit operates on a transfer facsimile principle that employs two different types of paper: a No. 1 sheet sensitive to light, and a No. 2 sheet not sensitive to light. Both papers are coated with special emulsion. The original to be copied is placed face to face with the No. 1 sensitized sheet and then inserted in the contact printer. After a 10 second exposure to light, the original and No. 1 sheet are removed from the contact printer. The original is set aside, unharmed in any way. Next — the exposed No. 1 sheet is placed in face to face contact with No. 2 sheet and both sheets inserted in the slots at the front of the Auto-Stat processing unit. The two sheets travel through the Auto-Stat automatically and emerge from the delivery slot, adhered together, in approximately 8 seconds. The operator simply peels the two sheets apart — and has a positive reproduction of the original on the No. 2 sheet. The No. 1 sheet can be either thrown away or saved as a reverse reading file copy.

The unit is especially designed to handle letter and legal-size copies, as well as larger copies up to 11 x 17 inches.

Illustrated booklet is available from the manufacturer: American Photocopy Equipment Co., 2849 North Clark St., Chicago 14, Ill.

Concrete Varnish

Known as Concrete Glaze, a fast-drying clear varnish has been marketed for concrete floors and other concrete surfaces in plants, warehouses and the like which are subjected to the wearing action of trucks, and other traffic which normally create a constant dust problem due to their abrading action.

The manufacturer claims that the new varnish seals the pores of concrete with a tough and lasting resinous coating that presents a clean, germ-resistant and attractive surface. The protective coating is not affected by any residual alkali in concrete; and since it has unusual resistance to acids, alkalies, grease, oil, water and steam, he believes it will outlast any other clear coating that may be used on concrete, interior or exterior surfaces.

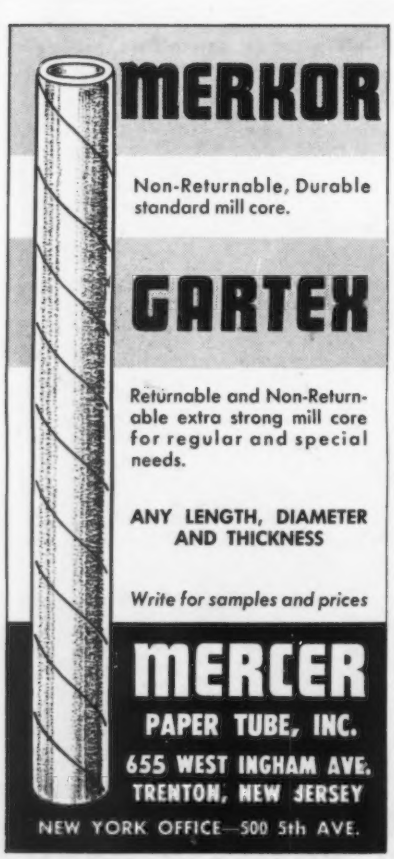
Brushed or sprayed the glaze dries to touch within an hour, and may be walked on within three to four hours; has good footing characteristics and does not present a slippery effect under any condition; also has an insulating effect, it is claimed.

For information write to Rex Home Supply Co., 142 S. Highland Ave., Ossining, N. Y.

Acrylic Thickeners and Protective Colloids

Polyco 296BT and Polyco 296N Acrylic Thickeners are aqueous solutions of sodium polyacrylate. They are water-soluble anonic colloids furnished as straw-colored, homogeneous solutions containing 15 percent solids. Polyco 296BT is a high-viscosity grade

(Continued on page 41)


MERKOR
Non-Returnable, Durable standard mill core.
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Returnable and Non-Returnable extra strong mill core for regular and special needs.
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NEW YORK OFFICE—500 5th AVE.

PEOPLE

(Continued from page 16)

DAVID I. EDWARDS, Vice-President and Director of Perkins-Goodwin Company is retiring on 12-31-51 because of ill health.

Dave Edwards has been in the paper business all his life. Starting with Perkins-Goodwin as office boy in 1916 at the age of 16, he worked his way up through the organization to become Paper Sales Manager in 1938. He was elected a Director of the Company in 1942 and Vice-President in 1947.

ROBERT A. HUSTON, manager of industrial relations for the Kalamazoo Vegetable Parchment Company for the last seven years, was elected by directors of the Fuller Manufacturing Company (Kalamazoo) to the position of vice-president in charge of public and industrial relations for the firm, according to E. L. Ludvigsen, Fuller president.

CHARLES G. BAUMANN has joined The Viking Paper Co. of New York City, as Sales Manager.

CARL J. BERGENDAHL will leave 'Pagel, Horton & Co., on January 1st, 1952 to become Managing Director of Hafrestroms A.B., pulp and paper mills at Haverud, Sweden.'

GOVERNMENT GOSPEL

(Continued from page 18)

M-72 Modified Limitation

1. The inventory is raised from 45 days based on estimated consumption of a grade during the first six months of 1952 to 60 days.

2. Carry over from one quarter to the next on unused pulp is increased to 10 percent.

3. Telegraphic reporting has been changed to "by mail."

4. The base period for allowable consumption of wood pulp is to be the first quarter of 1951 as an alternate to one fourth of consumption during 1950.

Hamersley Improved Greaseproof

A new highly greaseproof Barrier material to meet requirements of Government specifications JAN-B-121 has just been developed and put on the market by the Hamersley Manufacturing Company of Garfield, N. J.

The new sheet is being marketed as Hammerflex because of its greater softness, moldability and freedom from curl.

The new grade is very highly grease resistant and is made in Types II and III, Class I.

They will continue the Grade "A" Anti-Corrosive papers previously developed. Both grades are suitable for civilian and defense packaging purposes of bearings and machined metal parts.

Special Industrial Paperboard Subcommittee

Recommendation that the current level of prices be employed in a tailored regulation for their segment of the paperboard industry was made by members of the Special Industrial Paperboard Subcommittee of the Special Paperboard Industry Advisory Committee at their fifth meeting with OPS officials.

The committee suggested that these prices be frozen by OPS, rather than having the agency attempt to spell out dollars-and-cents ceiling prices for key grades.

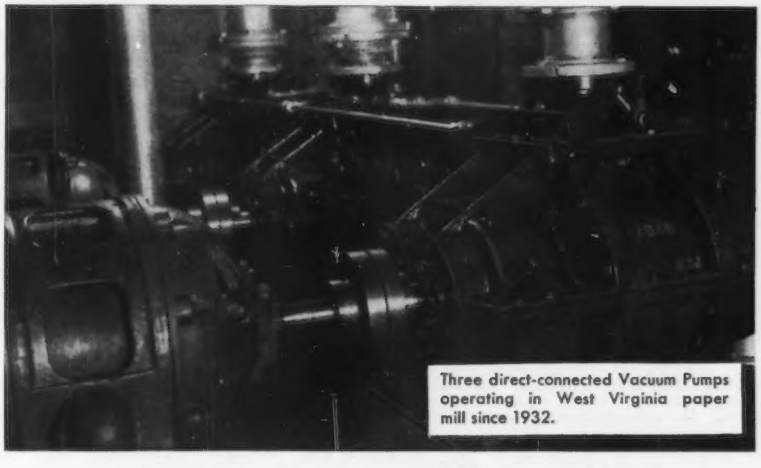
Members said it would be possible to select a limited number of such grades, but pointed out that specifications and prices varied widely in the industry.

They reported that current prices are below the ceilings permitted by CPR 22, the Manufacturers' General Ceiling Price Regulation, but are above the prices at which they were frozen January 26, 1951, by the General Ceiling Price Regulation, GCPR.

CMP Regs. 5 and 7 Amended

The NPA amended CMP Regulation 5 to permit manufacturers and repairmen to use priority ratings for obtaining materials for installation of industrial equipment.

(Continued on page 40)



Three direct-connected Vacuum Pumps operating in West Virginia paper mill since 1932.

COMPARE THESE 5 VALUES WHEN YOU BUY VACUUM PUMPS

Outstanding satisfaction with Roots-Connersville Vacuum Pumps for paper mill operation has been gained by their high ratings in these five essentials to adequate performance. Our engineers will gladly work with you in selecting equipment for your specific needs. Send for Bulletin 50-B-13, which deals exclusively with R-C Cycloidal Vacuum Pumps for Paper Mill Operation.

1. LOW POWER CONSUMPTION—because units are recommended, either single or compound, to operate at the most efficient point.

2. NEGLIGIBLE FRICTION LOSSES—no contact between impellers or impellers and casings.

3. HIGHER SPEEDS—permitting direct connection to standard motors, saving first cost, space and weight.

4. FLEXIBILITY—to meet varying demands; suction automatically overcomes resistance in system.

5. DEPENDABILITY—long-time, attention-free operation, due to simplified design and construction.

Roots-Connersville Blower Corp., 521 River Ave., Connersville, Indiana

Reg. U.S. Pat. Off.

ROOTS-CONNERSVILLE

BLOWER BUILDERS SINCE 1854

ONE OF THE DRESSER INDUSTRIES

17643

The amendment to CMP Regulation 5:

1. Permits manufacturers to obtain materials needed for installation of equipment in existing buildings on a priority basis in the same way they are permitted to obtain minor capital additions. A limit of two tons of carbon steel, 200 pounds of copper products, and *no* aluminum, stainless steel or alloy steel is established for each installation. NPA pointed out that installation under the regulation is *not* construction as defined in Order M-4A.

2. Establishes separate minimum quarterly quotas of $1,000 each for MRO supplies, minor capital additions and installations. Previously, the minimum for combined MRO and minor capital additions was $1,000 a quarter.

3. Raises from $750 to $1,000 the limit which a manufacturer may spend for each minor capital addition when he uses the MRO symbol to obtain materials.

Steel nails, wire and strapping used for packaging are removed from the prohibited list (Schedule 1).

CHEMIPULP PROCESS, INC.

CHEMICAL PULP MILL ENGINEERS

500 WOOLWORTH BUILDING
WATERTOWN, NEW YORK

Associated with CHEMIPULP PROCESS LTD.,
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TRENTON 2, NEW JERSEY

APPLETON Felts
FOR UNIFORMITY

APPLETON WOOLEN MILLS
APPLETON WISCONSIN

ASSOCIATIONS

(Continued from page 21)

delivered from a pressure inlet to a 110 foot wire. The two suction presses will have brass shells without rubber covers. The first section of dryers, consisting of six cylinders, will be operated without felts. There will be fifty-two main dryers — operated at steam pressures up to 100 pounds per square inch. Sixteen felt dryers will keep the dryer felts in good operating condition. The machine will operate at a speed of 900 feet per minute, and gradually will be speeded up to 1500 feet per minute. A high speed winder will complete the installation. The machine will produce only nine point corrugating medium made from semi-chemical hardwood pulp.

Mr. Martin further related that the pulp mill is about to be modernized; that two hydraulic barkers have been added; that continuously-operating digesters will be installed in the near future; and that washers of the screw press type will insure cleanliness of product and simultaneously will reduce the quantity of pulp mill waste water to the lowest possible volume.

Mr. Stowitts rather humorously told of the trials and tribulations encountered when putting a new paper machine in operation. In referring to his company's relatively new machine, one of the first machines to be built after World War II, he said that it is designed for a speed range up to 500 feet per minute and that it is capable of producing up to 224 tons of paperboard per day — the average production being 190 tons.

Additional information on these five machines was brought out in the interesting discussion that followed the more formal comments. R. H. Peeters, St. Regis Paper Co., Kalamazoo, chairman of the Michigan Division, presided at the meeting.

Northwestern Superintendents to Meet On May 9-10, 1952

Paul West, Thilmany Pulp and Paper Company, Kaukauna, Wis., has announced that the 1952 Spring meeting of the Northwestern Division of The American Pulp and Paper Mill Superintendents Association will be held on May 9-10 in Rockford, Ill. The meeting, according to Mr. West, will be highlighted by a trip through the Beloit Iron Works, Beloit, Wis.

Mr. West is chairman of the Division.

Ohio TAPPI December Meeting

The Ohio Section of TAPPI held a meeting at the Battelle Memorial Institute, Columbus, Ohio December 11, 1951. 140 persons, including approximately 20 guests from the Lake Erie section, were present. During the afternoon prior to the meeting, inspection trips through the Institute and the Pollack Paper Company Mill in Columbus were made. Mr. Walter Johnson of the Pollack Paper Company was the program committee member responsible for the arrangements for this meeting.

Mr. Lewis E. Walkup of the Battelle Memorial Institute was the speaker for the evening. His lecture and demonstrations were on the subject of Static Electricity. He briefly reviewed the elements of static electricity and the mechanisms of static generation and methods of static elementation were explained and demonstrated. It was shown that static changes on paper can be generated in two ways: (1) by contact electrification, and (2) by induction. Elementation of static in paper can be accomplished only if electrical conductivity is established either in the paper or in the air near the paper. Air is an insulator and must be ionized to become electrically conductive. Paper is an insulator when dry, but can be made conductive by absorbing moisture, such as by storage in a humid room. The need for further study on the problem of static electricity was emphasized. Mr. Walkup concluded that in spite of the advances made in understanding the problem, many unsolved problems remained. A systematic research into the principles underlying static electricity should uncover a number of facts which might have considerable economic value to the pulp and paper and its allied printing industry. From our present knowledge no set rules for elements of static electricity can be given. Each problem must be analyzed and studied as separate problems.

Program Chairman John Clouse announced the next meeting of the Ohio Section would be held January 10 in Middletown, Ohio. Mr. Paul Cope of the Procter and Gamble Company will speak on the subject of Paper Packages.

Foley Chairman Western CPPA

Harold S. Foley was elected as chairman of the western division of the Canadian Pulp and Paper Association at its annual executive meeting held at Vancouver, B.C., recently. Mr. Foley is president of the Powell River Company. B. M. Hoffmeister of the H. R. MacMillan organization was elected as vice-chairman.

Executive members Leslie Cleminson, general manager, Alaska Pine &

Cellulose Ltd.; Walter C. Keorner, vice-president, Alaska Pine & Cellulose Ltd.; J. G. Prentice, president Canadian Forest Products Ltd.; Dr. R. H. Ball, Columbia Cellulose Co. Ltd.; W. C. R. Jones, mill manager, Columbia Cellulose Co. Ltd.; H. J. Mackin, president, Elk Falls Co. Ltd.; R. J. Filberg, vice-president, Elk Falls Co. Ltd.; L. L. G. Bentley, president, Howe Sound Pulp Co. Ltd.; B. M. Hoffmeister, president, MacMillan & Bloedel Ltd.; Prentice Bloedel, vice-chairman, of the board, MacMillan & Bloedel Ltd.; W. J. Van Dusen, vice-chairman of the board, MacMillan & Bloedel Ltd.; Paul E. Cooper, president, Pacific Mills Ltd.; H. S. Foley, president, Powell River Co. Ltd.; M. J. Foley, executive vice-president, Powell River Co. Ltd.; J. A. Craig, general manager, Sidney Roofing & Paper Co. Ltd.; E. M. Herb, president, Westminster Paper Co. Ltd.; F. F. Foote, secretary-treasurer, Westminster Paper Co. Ltd.

Pulp Importers Elect Officers

The Association of American Wood Pulp Importers held their annual meeting and election of officers for the year 1952 at Sherry's, 300 Park Avenue, New York, N. Y. on December 13th.

The following officers were elected: President, Albert Blattmann; Vice President, John Westergaard; Secretary, Harold J. Lanney; Treasurer, V. Ramsay; Director, Stanford G. Blankinship.

NAWMD Plans Annual Convention

Paul Jos. White, Great Eastern Packing & Paper Stock Corp., New York City, will be the chairman of the thirty-ninth annual convention of the National Association of Waste Material Dealers, Inc., at the Waldorf-Astoria, March 17-19, 1952.

The announcement has been made by James T. Flannery, James T. Flannery Co., Jersey City, N. J., president of NAWMD.

Mr. Flannery also appointed two vice-chairmen to assist Mr. White with the convention program. The vice-chairmen are William Abramson and Herman D. Moskowitz.

NEW EQUIPMENT

(Continued from page 38)

and Polyco 296N is a medium-viscosity grade.

These acrylic thickeners are primarily used as stabilizers, protective colloids and thickeners for natural, synthetic rubber and resin latices. They possess unique adhesive, suspending, emulsifying and film-forming characteristics which suggest other industrial uses.

Properties named for these new water-soluble resins are: high viscosities of low temperatures; non-creaming thickener for latices; flexible, tough, elastic film-former; fully saturated—will not yellow, embrittle or oxidize; stable at alkaline and mildly acid pHs; derived from synthetic materials—will not rot, mildew or sour.

Address requests for samples and data sheet P-27 to American Polymer Corp., Peabody, Mass.

NEW LITERATURE

Dominion Engineering Co. Ltd., P. O. Box 220, Montreal, Que. Bulletin No. 12, Vol. XVIII, "Evaluating Engineers, Part 3." Discussion of methods for job evaluation and merit rating in creative engineering.

Gould-National Batteries, Inc., Trenton 7, N. J. Brochure, "Gould Battery News." Features: "How Ohio Boxboard Maintains 195 Industrial Truck Batteries."

Lukens Steel Co., 584 Lukens Building, Coatesville, Pa. Bulletin, "Benefits of Design and Clad Steel Construction in Coal Handling Equipment." Discusses design of hoppers, chutes, bunkers, etc., corrosion and erosion, and clad steel equipment. Illustrated with schematic sketches.

Metron Instrument Co., 432 Lincoln St., Denver 9, Colo. Technical data sheet No. MI. Describes miniature combination fixed and variable-speed drives, for use in low-power applications requiring variable speed at a reduced nominal output speed.

Minneapolis-Honeywell Regulator Co., Station 40, Brown Instrument Div., Wayne and Windrim Aves., Philadelphia 44, Pa. Catalog 5000, "Composite Catalog." Describes the principal instruments, control devices and related components manufactured by Honeywell Industrial Div.. . . Bulletin, "Proper Valve Lubrication . . . A Prerequisite to Good Control." Covers the function, proper selection, methods of application and the various types of lubricants in general use. . . . Catalog 1700, "Air-Operated Butterfly Valves." Gives specification data for both Standard and Heavy Duty Pattern Valves. Illustrates and describes a wide selection of Diaphragm Operators. . . . Catalog 1800, "Adjustable Port Valves." Covers the use of Honeywell Air-O-Motor Diaphragm Operators with North American Adjustable Port Valves. Gives specification data covering valves for gas, air, oil, steam and water regulation.

Standard Electric Mfg. Co., West Berlin, N. J. Catalog, "Standard Fans and Blowers." Lists wide range of ventilating fans, air circulators, belt-driven exhaust fans, floor and window fans, etc., for industry. Also spray booth fans, pressure and volume blowers in types and capacities for most industrial applications.

Towmotor Corp., 1226 E. 152nd St., Cleveland 10, Ohio. Bulletin, "Job Study No. 111." A certified survey of terminal operations at Smith's Transfer Corp., Staunton, Va.

CORROSION

COSTS THE PAPER INDUSTRY MILLIONS EACH YEAR

VITAL EQUIPMENT IS DESTROYED...PRODUCTS CONTAMINATED

Corrosion eats away vital equipment that today is hard to replace.

Corrosion may cause contamination of your products, resulting in unnecessary loss of production and profits.

It causes loss of output and waste of man-hours when your plant is shut down for repairs due to corrosion.

Every businessman knows this; but do you know that the total cost to American industry is $6,000,000,000 annually . . . and do you know how much corrosion increases costs in your own operations?

Perhaps the answer is Amercoat. Amercoat is a line of individualized protective coatings . . . each built to protect against a specific industrial corrosion problem.

Amercoat field engineers are available . . . without obligation . . . to check your plant for corrosion problems . . . and to make specific recommendations.

Why not start your checkup *now*? We'll be glad to help you.

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FOR ALL EQUIPMENT EXPOSED TO CORROSION BY SULPHITE ACIDS OR OTHER CORROSIVE AGENTS

MICHIGAN STEEL CASTING CO.
DETROIT 7, MICHIGAN

AMERICAN PAPER AND PULP ASSOCIATION'S PAPER PRODUCTION RATIO REPORT

(Production as per cent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

	Nov. 24	Dec. 1	Dec. 8	Dec. 15	Dec. 22
1951	94.7	99.9	98.8	97.0r	96.1
	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23
1950	96.3	97.1	100.1	100.1	95.2

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1950	92.6	95.6	96.7	95.4	96.4	97.7	85.3	99.6	96.1	101.0	99.6	91.2	95.8
1951	99.3	101.3	101.9	102.8	102.2	100.1	88.6	97.7	94.3	100.8‡	98.4‡		

‡ Preliminary.
r Revised.

COMPARATIVE YEARLY SUMMARIES

	1944	1945	1946	1947	1948	1949	1950	1951
Year to date	88.1	89.7	101.4	104.9	96.7	88.9	96.6	99.6
Year Average	88.1	89.4	101.4	104.3	96.2	88.6	95.8	

PAPERBOARD OPERATING RATIOS†

	Nov. 24	Dec. 1	Dec. 8	Dec. 15	Dec. 22
1951	75	80	86	86	86
	Nov. 25	Dec. 2	Dec. 9	Dec. 16	Dec. 23
1950	100	101	106	105	105

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Ave.
1950	88	92	91	92	91	94	82	100	96	102	101	95	94
1951	102	105	104	105	104	103	84	94	86	87	82		

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

Note: The black line on the chart shows the ratio through December 1950 on the basis of 6-day capacity. Beginning with January 1950 the ratio is shown on the new basis of normal 6 and 7-day capacities by the colored line. Paperboard operating ratios continue on the basis of a 6-day week.

† Per cent of operation based on "inch-hours" reported to the National Paperboard Association.

FINANCIAL

Marathon Corporation sales reached a record high of $91,552,950 in the fiscal year ended October 31, 1951, compared with a previous high of $68,269,814 in the 1950 fiscal year, D. C. Everest, president, told stockholders in his annual report released today.

Despite a 203 percent increase in income tax provisions over the preceding year, net earnings of the company also set a new record. They were $8,801,001, as against $6,536,036 the year before, equal after preferred stock divdends to $6.59 a share on 1,300,000 shares of common stock outstanding, as against $4.84 the year before.

Provision for federal, state and Canadian income taxes, including an excess profits tax of $3,585,000, totaled $16,564,137 in the latest fiscal year, compared with $5,458,314 the year before.

"We feel we would be remiss in our duty if we did not make reference to the terrific tax burden imposed on us by the recent tax law," Mr. Everest said. "We do not think anyone can properly budget a business operation if tax rates continue to be increased and also made retroactive. During the entire time the tax bill was being considered in Congress, management was forced to engage in a guessing game as to tax accruals. It is significant to note that in the fiscal year just closed, federal, state and Canadian income taxes took 18 percent of each sales dollar, whereas in the previous year it was 8 percent. The year 1952 may show an even greater percentage as the new law only applied to seven months of the recent fiscal year's operations."

The report also pointed out that tax provisions were equal to $12.74 per share of common stock, compared with net earnings of $6.59 per share.

Everett Pulp and Paper income goes partly to Children's Hospital.

The Children's Orthopedic Hospital at Seattle is receiving $125,000 per year from the estate of A. H. B. Jordan. The income represents a one third interest in the Everett Pulp & Paper Co.

Since the purchase of Everett by Simpson Logging, the Everett shares have been replaced by Simpson notes for $4 million bearing 4½ percent interest payable in ten to twenty years.

OBITUARY

Maurice E. Cody, 63, general manager and vice-president of the Black-Clawson Company's Hamilton Division and a veteran of many years in the paper industry, died in Mercy Hospital, Hamilton, Ohio, December 20.

CLEARING HOUSE

HELP WANTED

MEN WANTED—POSITIONS OPEN

We can place—assistant manager for mill making paper, board, newsprint, sulphite, etc., including pulp mfg. and converting dept.; asst. supts. Cylinder board mill (2); personnel supervisor, working supt. small mill on light weight papers.

Chemists and chemical engineers, salary range, $3600-$8500; laboratory men; designers; draftsmen; master mechanics; mechanical, plant and electrical engineers; sulphite foreman, rotating shifts; machine tenders and back tenders.

LIST YOUR CONFIDENTIAL APPLICATION WITH US to keep informed of attractive positions open in the pulp and paper mills.

CHARLES P. RAYMOND SERVICE, Inc.
294 Washington St., Boston 8, Mass.

SPECIALISTS IN PLACING AND IN SUPPLYING PULP AND PAPER MILL EXECUTIVES

J-4

WANTED
Night Superintendent

A New England Mill wants a man with experience in manufacturing Rag Content and High Grade Sulphite Papers, desiring permanent connection. Must have ability in directing men and must be an experienced machine man as well as familiarity with Beater Room Operation. Apply for appointment. Address Box 52-6 care Paper Trade Journal.

J-4

CHIEF ENGINEER

Experienced Paper Mill Engineer to develop the Engineering Department and new products of a rapidly growing machinery company. This is an excellent opportunity for a top man and the pay scale warrants a top man. Applicant must be a graduate engineer with a minimum of ten years experience in the industry. Kraft experience preferred but not essential. Please reply to Box number 52-4, care Paper Trade Journal. J-11

WANTED
PAPER MILL ENGINEER

Engineer-constructor firm has opening for Pulp and Paper Mill project engineer at Pittsburgh Headquarters. Must have 4 or more years experience in engineering department of a paper mill, or experience in pulp and paper mill design. In first letter submit complete resume of personal background, education, age, and experience. Write O. M. Rutledge, The Rust Engrg. Co., 575 Sixth Ave., Pittsburgh, Pa. J-11

WANTED — Machine Tenders and Back Tenders for corrugating medium and liner mill, Fourdrinier and cylinder machines. Located in Western Pennsylvania; good working conditions; pleasant surroundings and very good labor relations. Call collect—Tarentum 1470. TARENTUM PRODUCTS CORPORATION, Tarentum, Pa. TF

WORKING SUPERINTENDENT for small fast growing Eastern mill making lightweight specialties. Cylinder machine experience essential. State qualifications and salary expected. Address Box 51-596 care Paper Trade Journal. TF

HELP WANTED

MANAGER
For Paperboard Mill In Toronto, Canada Area
Essentials:
Must Be Technical Graduate
Good Character and Personality
With Ability To Handle Men
State
Age, Previous Experience And Accomplishments
Salary Expected And When Available
All Replies Held Strictly Confidential
Box No. 51-634 care Paper Trade Journal J-4

WANTED—Master Mechanic or Assistant for modern 3-Machine Tissue Mill. Progressive management; expansion program now under way. Fine opportunity for young/middle aged man to advance. Substantial paper mill mechanical experience with electrical background desirable. Give complete resume of experience in letter to Box 51-442 care Paper Trade Journal. Replies held strictly confidential. TF

SALARIED POSITIONS $3,500 to $35,000. We offer the original personal employment service (established 42 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. R. W. BIXBY, INC. —117 Dun Bldg., Buffalo. 2, N. Y. TF

WANTED — Adjuster on S.O.S. Potdevin Grocery Bag Machines. Top wages. Confidential. Address Box 51-618 care Paper Trade Journal. J-4

WANTED—One Tour Foreman for sulphite pulp mill located in Western Massachusetts. Salary according to ability. Address Box 51-633 care Paper Trade Journal. J-18

POWER PLANT ENGINEER WANTED to take complete charge of power department. Address Box 51-635 care Paper Trade Journal. J-25

PLANT ENGINEER—Opportunity for qualified graduate Engineer with extensive experience in general plant engineering and operations in the Pulp and Paper Industry and particularly the kraft process. Address Box 52-2 care Paper Trade Journal. TF

SITUATIONS WANTED

SUPERINTENDENT desires change. Thoroughly experienced in finishing and converting—highly successful in production—good labor relations. A-1 references. Address Box 51-636 care Paper Trade Journal. J-11

QUALIFIED FOREMAN—Able to instruct and adjust equipment for transparent Bag Dept. Thoroughly experienced on Aniline Printing Press. Fifteen years Paper Bag trade experience. Address Box 52-1 care Paper Trade Journal. J-4

FOR SALE

FOR SALE

1—Complete Rotating Frame Drive Synchronous Tie Draw Control, consisting of nine sections suitable for driving Fourdrinier Paper Machine up to 170" in width, maximum speed 600 feet per minute, minimum 100 feet per minute, complete with all controls and necessary M. G. Sets. Address Box 51-628 care Paper Trade Journal. J-4

FOR SALE—One 160" Newsprint Machine. Address Box 52-3 care Paper Trade Journal. J-18

FOR SALE—49" Wolverine two-color Aniline Printing Press, less than year old. (Provision for four colors). Owner giving up private plant. Address Box 51-632 care Paper Trade Journal. J-4

FOR SALE

CAMERON SLITTERS

1—42" Type 26-2A
1—52" Type 9-5
1—52" Type 8-5
1—42" and 1—62" Type 6
1—32" and 1—42" Type 40-2A.
1—42" and 1—62" Type 40-1-AF.
1—72" Type 10-8-14 Shear Cut.
1—72" Type 5.
1—62" and 1—82" Type 10.

OTHER SLITTERS

1—62" Beck Duplex Rewind Razor Blade Slitter & Rewinder. Suitable for paper and plastics.
1—48" Meisel Shear Cut, Series O.P. 2.
1—42" Kidder Merchant Model Pneumatic Control Shear Cut.
1—62" Type AA Langston Shear Cut.
1—36" Special Cellophane and Paper Slitter.
1—60" Hammersley Score Cut.
1—30" and 1—42" Langston Type A Shear Cut.
1—42" Langston Center Wind Duplex Shear Cut Slitter and Rewinder.

POWER PAPER CUTTERS

10—Seybold, 65" 6-Z, 44", 54" and 63" 20th Century; 34", 44", 48" and 54" Holyoke; Dayton, 50" and 74".
5—Oswegos, 32", 38", 44", 50" and 57".
6—Sheridans, 34", 36", 40", 50", 54" and 56".
1—Dexter, 50".
5—Acme, 32", 34", 36", 46" and 50".
1—Smith and Winchester Undercut 63".

MISCELLANEOUS MACHINES

1—36" Hudson-Sharp A-2 3 color Aniline Printing Press, with 4-A Sheeter. Roll to roll or roll to sheet.
1—24" Schultz Automatic Waxed and Shelf Roll Machine. Rewinds 25' to 250'.
1—6½" and 1—20" four unit Champlain Rotogravure Presses.
1—72" Hudson-Sharp 25W Winder for Waxed and Household paper rolls.
1—36" Beck Rotary Sheeters.
1—Sheridan Die Press, Model 8B Platen 33" x 46". Automatic Feeder.
1—New 24"—2 color, Roll to Roll Aniline Press.
1—52" Waldron Anti-friction Embossing Machine with Slitting attachment.
1—49" 2 Color Wolverine Aniline Hydro-Printer. Roll to Roll.
1—Amesco heat sealing, crimping and folding machine.
2—Potdevin Waxing Machines, 82" wide.
2—Brand new 81" Dietz, very latest type, friction rewind combination toilet and towel roll convertors. Automatic counters and stop motions.
1—McCabe Folding Facial Tissue Machine for making package facial.
1—45" and 1—48" Hamblet Rotary Sheeter.
1—64" Dillon Duplex Rotary Sheet Cutter.
1—94" Moore & White Duplex Rotary Sheet Cutter.
1—116" Model 29 Hamblet Duplex Rotary Sheet Cutter, slitting attachment, Erie automatic layboy and twelve roll backstands.
1—36", 1—50" and 1—74" Hamblet Single Rotary Sheeters with Layboys, Slitting attachments and Backstands.
2—Asphalt Laminating machines, one 70" and one 88".
1—1 color Rotary-X Gummed Tape Printing Press.
1—84" Carthage wood chipper, 10 knives, belt drive.
2—36" x 76" Wet Machines.
2—#2 Lasnoye Pulpers.
2—2000 lb. Niagara Iron Tub Beaters.
1—162" Moore & White 4-drum winder.
1—10' diam. x 132" face Beloit Yankee Dryer.
1—114" Sandy Hill eleven roll stack of Calenders.
1—34" Waldron Gummed Paper Breaker.
1—40" Special roll to roll coater or Lacquer saturator.
1—48" Waldron Roll to Roll Lacquer Coater
1—42" Waldron, 2 Roll, Roller Coater. Puts 2 coats on both sides of web at one time or any combination. Applies any material to paper, cellophane, plastics, etc.

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21 East 40th Street, New York 16, N.Y.
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265 PASSAIC STREET
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CONVERTING PAPER MAKING EQUIPMENT

NEW, USED, REBUILT PAPER AND PULP MACHINERY

MACHINERY WANTED FOR OUTRIGHT PURCHASE
From a Single Item to A Complete Mill.

BEATERS
1—Dilts 750 lb. Iron Tub. Roll 44" face x 50" diameter.
1—Downingtown 1000 lb. Iron Tub. New roll 48" face x 48" diameter.

CALENDER ROLLS
48 Chilled Iron Rolls—Assorted sizes.

CALENDER STACKS
1—3 roll—62". All rolls bored for steam.
1—Farrel Birmingham, 5 roll, 108" Calender Stack, with doctors. 2 rolls bored-for steam.
1—Black Clawson 124" 9 roll with doctors and oiling system.
1—Black Clawson 124" 7 roll with doctors and oiling system.
1—Black Clawson 90" 7 roll with 3 spare rolls.

CYLINDER MOLDS
1—134" face x 36" diameter, with stainless steel shafts.

DAMPENER
1—Valley Micromist Unit for water finish on paper—120" deckle.

DRYERS
2—124" face x 48" diameter.
1—77" face x 48" diameter—with gear.
1—120" face x 18" diameter—Baby Dryer.
1—102" face x 48" diameter, with bearings.
3—110" face x 42" diameter with bearings and gears.
1—100" face x 42" diameter Creping Dryer.
4—42" face x 36" diameter, with frames, gears and bearings.
19—48" face x 48" diameter, with gears, bearings and steam joints.
21—126" face x 42" diameter.
3—116" face x 48" diameter.
2—103" face x 48" diameter.
2—116" face x 36" diameter, with gears and bearings.
1—110" face x 48" diameter.
12—65" face x 36" diameter. Complete with 2 deck frames, gears, bearings, steam joints, felt rolls, sole plate and 2 press sections.

EXTRACTOR ROLLS
1—Downingtown Extractor Roll 128" face x 24" diameter. Anti friction bearings

FILTERS
1—Oliver Vacuum Filter. Cylinder 8' face x 5' 6" diameter. Iron end vat.

FLAT SCREENS
3—8 plate Sandy Hill Roller Shoe with scrapers.
1—Sandy Hill 12 plate roller shoe.
3—Bagley & Sewall 8 plate, with scrapers and plates.
1—6 plate tailing screens with scrapers.
1—4 plate tailing screen with scraper.

HYDRAPULPER
1—Shartle Brothers 16' batch Hydrapulper with hydraulic dump valve and skip hoist. Complete, including drive—less motor. New 1947.

HYDRAULIC PRESS
1—Thorpe 200 ton. Steam platens, 40"x40" with pump.

JORDANS
1—#6 Miami, for motor drive.
3—Jones Majestics with base and couplings—
2—#3 Appleton with base and coupling.
1— Jones Majestic. Stainless Steel Fillins.
3—E. D. Jones Pony. 3/16" stainless steel fillings—banded plugs. Spare new fillings.
1—Smith & Winchester Stainless with granite fillings.

LABORATORY EQUIPMENT
1—Nobe and Wood anti friction Jordan 13" plug —1/4" stainless steel fillings—direct connected to 10 h.p. 220/440/3 phase 60 cycle, 530 r.p.m. motor.

LAMINATOR
1—Black Clawson 65" Laminator with 5 presses—6 dryers 36" diameter. Unwind stands and rewind stands.

MOTORS
1—Allis Chalmers 30 h.p. 440 v. 660 r.p.m.
2—Westinghouse 100 h.p. slip ring, 440 v, 3 ph., 60 cyc. 690 r.p.m.
1—Crocker Wheeler 100 h.p. slip ring, 440 v., 3 ph. 60 cyc. 710 r.p.m.
1—Allis Chalmers 100 h.p. 440 v., 3 ph., 60 cyc., 580 r.p.m.
1—Western Electric 100 h.p. 440 v., 3 ph., 60 cyc., 695 r.p.m.
25 others 440 v. motors from 2 h.p. to 15 h.p.
2—Westinghouse 200 h.p. 2200 volts—3 ph.—60 cycle—600 r.p.m. Synchronous speed with controls and grids.
1—Westinghouse 150 h.p. 2200 volts—3 ph.—60 cycle—580 r.p.m. with controls and grids.
1—General Electric—75 h.p.—2200 volts—3 ph.—60 cycle—430 r.p.m.
1—General Electric—25 h.p.—230 volts—3 ph.—60 cycle—300/900 r.p.m.

PULP EQUIPMENT
1—Mitts & Merrill #17 Pulpwood chipper.
1—Bird ball bearing Pulp Screen. Practically new. Used 6 months.
2—APMEW Ball Bearing Pulp Screens—30 ton capacity—outward flow.
1—D. J. Murray 10' x 25' Barking Drum.
1—Carthage 10 knife Chipper 16" spout with belt drive

PULPERS
2—#2 Lannoye.

PUMPS
44—Centrifugal Pumps, open & closed impellers. Direct connected or Belt Driven. Extended base for motor. Assorted capacities and heads. Most used less than one year.

REDUCERS
1—Link Belt 40 h.p. Ratio 2.2-1. 508 r.p.m.-227 r.p.m.

REELS
1—2 bowl 104"—22" diameter iron bowls.
1—2 bowl 94"—16" diameter bowl.

ROLLS—PRESS, COUCH, etc.
32—Press rolls, brass and rubber covered.
14—Couch rolls, brass and rubber covered.
250—Brass and steel carrying rolls.

ROTARY SCREENS
2—#2A Bird Rotaries. Copper vats.
1—#2 Bird—Copper Vat.

RUBBER COVERED COUCH ROLL
1—New 110" face x 18" diameter—1" rubber.

SCREW PRESSES
1—Valley Voith Screw Press Size 2.
1—Valley Voith Screw Press—enclosed drive.

SHEETERS
1—Hamblet 124" Duplex Sheeter with maxim layboy—8 roll backstand—motor and starter.
1—Moore & White Simplex 114" Sheeter with slitters—counter. Maxim layboy overlapping delivery. 8 roll backstand, motor and starter.
1—48" Kidder Seet Sheeter.
1—84" Duplex Dillon with 15 roll Back Stand.
1—Beloit 112" duplex Sheet Cutter with duplex overlapping layboy, drive and motor.

SHREDDERS
1—American 37" Hamermill, anti-friction bearings.
1—Jeffrey 26½" Knives—7 knife rotor—6 knife bed plate. Ball bearing.

SLITTERS AND WINDERS
1—Beloit 125" Paper Machine Slitter and Rewinder—42" rewind.
1—Hudson Sharp 25W—66" Wax roll slitter and rewinder. New 1947.
3—Cameron 42" Model 6—24" rewind.
2—Miesel 42".
1—Cameron 42"—Model 26—2A.
1—Beloit 80" 2 drum, with Lewellyn Drive, shear cut slitters, backstand—34" rewind.
1—Langston 50" Shear Cut with 25 sets of slitters and motor.
1—Cameron 44" model 9-5.

STEAM TURBINES
1—De Laval 225 h.p. Initial pressure 140 p.s.i. Exhaust pressure 35 p.s.i. Complete with gear reducer.
1—De Laval Variable speed—375 h.p. at 135 gauge and 30 p.s.i. exhaust. Complete with gear reducer.

STOCK PUMPS
1—Shartle 10 x 20 Single Plunger Pump.
2—Beloit 8x10 Triplex.
2—Deming 7 x 8 Triplex—all bronze. New 1947. Enclosed drives.

STUFF PUMPS
1—Triplex—7 x 14. Used less than 1 year.
1—Shartle Asi-flo. Suction 13" discharge 14" and 4". Anti friction bearings.

SUCTION COUCH ROLLS
2—Millspaugh 36" diameter x 234" drilled face with enclosed drive, water cooled bearings, 12" suction boxes and 1 spare shell.

SUCTION PRESS ROLLS
1—Sandusky 97" drilled face x 14" diameter.

SUPERCALENDERS
1—Norwood 74" 9 roll with unwind and rewind. Complete with drive and 2 spare rolls.
1—Norwood 64" 10 roll with unwind and rewind. Complete with drive and 2 spare rolls.
1—Norwood 58" 9 roll with unwind and rewind. Complete with drive and 2 spare rolls.

TOILET TISSUE PERFORATOR
1—Paper Converting Machine Co. Model 141 automatic 81" Perforator, slitter and Winder —with three motors—ball bearing.

VACUUM PUMPS
4—Nash ½ H-5 Vacuum Pumps
2—Nash #3.
1—Nash #2.

WAXING MACHINES
1—84" Potdevin complete from let off to single roll rewind section.
1—34" Special—complete from 2 roll let off to single roll rewind.

WRAPPING MACHINE
1—Morrow Stevens type 1C. Package thickness 3/4" to 5". Used 30 days.

WHY LIST YOUR EQUIPMENT? — WE WILL BUY IT.

FOR SALE • FOR IMMEDIATE DELIVERY

1—7 CYLINDER 136" BOARD MACHINE.

48" DIA. CYLINDER MOLDS WITH 17½" DIA. RUBBER COUCHES

2 Rubber Covered Suction Press Rolls.
Entire Wet End Timken Roller Bearing Equipped.
102—Dryers—42" diameter x 132" face. Equipped with Sheahan Rope Carriers. Dryers stacked vertical 4- 5- 6 high. Equipped with continuous oiling system.
1—Pair of Extractor Rolls.
2—9 roll Calender Stacks.
1—20' Dilts Hydrapulper.
2—Jordans.
$40,000 worth of spare parts.

THIS MACHINE CAN BE INSPECTED ON ORIGINAL FOUNDATION AND IS THE FINEST CYLINDER MACHINE ON THE NORTH AMERICAN CONTINENT.

Full specifications and prints on request.

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1-4

FOR SALE

REBUILT ELECTRICAL MACHINERY

AC MOTORS (3 ph. 60 cy.)

HP	Make	Wdg	Spd.	Type
400	G.E.	S.R.	450	MT
300	G.E.	S.R.	450	I M
125	West.	Syn.	277	
100	G.E.	S.R.	450	I M
100	Al.Ch.	S.C.	720	ARX
100	West.	Syn.	900	
100	G.E.	S.C.	1750	IK
100	West.	S.C.	1200	CS
75	West.	S.C.	900	CS
75	G.E.	S.L.	575	ITC
50	West.	S.C.	1750	CS
50	West.	S.C.	900	CS
50	Al. Ch.	S.C.	1200	AR
60	West.	S.R.	575	CW
4-50	G.E.	S.C.	1750	KT
40	G.E.	S.R.	860	MT
25	500 v. West.	S.C.	1750	CB365
25	Cr.Wh.	S.C.	865	
25	West.	S.C.	1750	CS
20	Al. Ch. (new)	S.C. (Hi-Torq)	1685	ARWHH
20	West.	S.C.	1750	CS
15(2)	Al.Ch.(New)	S.C.	1200	AR
15	Al.Ch.(New)	S.C.	1800	AR

HP	Make	Wdg	Spd.	Type
10	West.	S.C.	570	C8566C
10(5)	Al.Ch.	S.L.	575	ARY
10	West.	S.C.	1200	C8370C
10(2)	Al.Ch.(New)	S.C.	1200	AR
10	Al.Ch.(New)	S.C.	1800	AR
7½	Al.Ch.(New)	S.C.	1200	AR
7½	Al.Ch.(New)	S.C.	1800	AR
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Lobdell United Co.
Norton Company
Samuel C. Rogers and Company
The Sandy Hill Iron & Brass Works

GRINDING WHEELS
Norton Company
Simonds Abrasive Co.

GUIDES
The Bagley & Sewall Company
Black-Clawson Co.
Egan, Frank W., & Co.
Gilbert & Nash Co.
The Moore & White Co.
Mount Hope Machinery Co.
Rice Barton Corporation
John Waldron Corp.

GUMMING MACHINES
Dilts Machine Works
Egan, Frank W., & Co.
The Sandy Hill Iron & Brass Works
Waldron, John, Corp.

GUMS
Hercules Powder Co., Inc.
National Starch Products, Inc.
Stein-Hall Co., Inc.

HEAT EXCHANGERS AND RECOVERY SYSTEMS
Fibre Making Processes, Inc.
Westinghouse Electric Corp.

HEATING, VENTILATING & AIR CONDITIONING
The Appleton Machine Co.
E. D. Jones & Sons Co.
General Electric Co.
D. J. Murray Mfg. Co.
Red-Ray Mfg. Co., Inc.
Ross Engineering Corp., J. O.
Valley Iron Works Co.
Ross, J. O., Engrg. Corp.

HOSE (Air, Water, Suction, etc.)
The Goodyear Tire & Rubber Company

HUMECTANTS
Aktivin Division, Heyden Chemical Corp.
Nopco Chemical Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

IMPREGNANTS
American Cyanamid Company, Industrial Chemicals Division
B F. Goodrich Chemical Co.

INDENTING MACHINES
Dilts Machine Works

INDUSTRIAL TRACTORS
Towmotor Corp.

INKOMETER
Thwing-Albert Instrument Co.

INSTRUMENTS, TESTING AND MEASURING
Black-Clawson Co.
Brown Instrument Co.
Bunge Pulp & Paper Co.
Cambridge Instrument Co.
General Electric Company
W. & L. E. Gurley
B. F. Perkins & Son
Taylor Instrument Cos.
Testing Machines, Inc.
Thwing-Albert Instrument Co.
Williams Apparatus Co.

JOINTS
The Bagley & Sewall Company
Beloit Iron Works
Johnson Corp.
Lovejoy Flexible Coupling Co.
Rice Barton Corporation
Shartle Bros. Mch. Co.

JORDAN FILLINGS
Appleton Machine Co.
Bahr Brothers Mfg. Co.
E. D. Jones & Sons Co.
The Noble & Wood Machine Co.
Shartle Bros. Mch. Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

KNIVES
Black Clawson Company
Dilts Machine Works, Inc.
Hamblet Machine Co.
E. D. Jones & Sons Co.
The Moore & White Co.
The Noble & Wood Machine Co.
Simonds Saw & Steel Co.
Taylor Stiles & Co.
Valley Iron Works Co.

KNOTTERS
Black-Clawson Co.
Fibre Making Processes, Inc.

LABORATORY CORRUGATOR
The Noble & Wood Machine Co.
Thwing-Albert Instrument Co

LABORATORY EQUIPMENT
Appleton Machine Co.
Bauer Brothers Co.
Bird Machine Company
Dilts Machine Works
W. & L. E. Gurley
Egan, Frank W., & Co.
E. D. Jones & Sons Co.
Taylor Instrument Companies
Testing Machines, Inc.
Valley Iron Works Co.
John Waldron Corp.
Williams Apparatus Co., Inc.

LAMINATING MACHINES
The Bagley & Sewall Company
Dilts Machine Works
Egan, Frank W., & Co.
Rice Barton Corporation
John Waldron Corp.

LAY BOYS
Dilts Machine Works
Gibbs-Brower Company, Inc.
Hamblet Machine Co.
Moore & White Co.

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Hercules Powder Co., Inc.

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Sinclair Refining Co.
Socony-Vacuum Oil Co.
Sun Oil Company
The Texas Company
Tide Water Associated Oil Co.

MAGAZINE REELS
Dilts Machine Works (Kohler Systems)

MATERIALS HANDLING
Dilts Machine Works
Jeffrey Mfg. Co.
Shartle Bros. Mch. Co.
The Wellman Engrg. Co.

METAL TIRES
Stroh Process Steel Co.

MICROMETERS & CALIPERS
Farrel-Birmingham Co.
Lobdell Co.
Stephens-Adamson Mfg. Co.
Testing Machines, Inc.

MICRO-CRYSTALLINE WAXES
Bareco Oil Co.
Bunge Pulp & Paper Co.
Sun Oil Company

MOISTURE CONTENT CONTROL
Cambridge Instrument Co.
Williams Apparatus Co., Inc.

MOTORS AND GENERATORS
Allis-Chalmers Mfg. Co.
Fairbanks, Morse & Co.
General Electric Company
Reliance Electric & Engrg. Co.

NEWSPRINT
Bunge Pulp & Paper Co.

NICKEL AND NICKEL ALLOYS
The International Nickel Co.

NOZZLES
Spray Engrg. Co.

PACKING BOXES
Johnson Corporation
The Moore & White Co.
Shartle Brothers Machine Co.

PAPER MACHINE DRIVES
The Bagley & Sewall Company
Black-Clawson Co.
Manchester Machine Co.
Rice Barton Corporation

PAPER MACHINES
The Bagley & Sewall Company
Beloit Iron Works
Bagley & Sewall Co.
Black Clawson Company
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Lukenweld
Moore & White Co.
Pusey & Jones Corp.
Rice Barton Corporation
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.

PAPER MACHINES—LABORATORY
The Noble & Wood Machine Co.

PAPER MACHINE SLICES
Black Clawson Company
E. D. Jones & Sons Co.
The Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Valley Iron Works Co.

PAPER TUBE MACHINERY
Dietz Machine Works
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Hudson Sharp Machine Co.
Jagenberg-Werke Akt. Ges.
Langston Co., Samuel M.

PARAFFINE WAXES
Sun Oil Company

PARAFFIN WAX EMULSIONS
Hercules Powder Co., Inc.
Nopco Chemical Co.

PASTING MACHINES
Beloit Iron Works
Black Clawson Company
Dilts Machine Wks.
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Murray, D. J., Mfg. Co.
Moore & White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

PEBBLE MILLS
F. L. Smidth & Co.

PERFORATED METAL
Allis-Chalmers Mfg. Co.

pH METERS
Cambridge Instrument Co.
Thwing-Albert Instrument Co.

PIPE
Armco Drainage & Metal Products, Inc.
Babcock & Wilcox Co.
Crane Company
Grinnell Company
Michigan Steel Casting Co.
National Tube Co.
Walworth Company

PIPE FITTINGS
Armco Drainage & Metal Products, Inc.
Crane Company
Grinnell Company
Michigan Steel Casting Co.
Walworth Co.

PITCH CONTROL
American Cyanamid Company, Industrial Chemicals Division
General Dyestuff Corp.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Rohm & Haas Co.

PLASTICIZERS
American Cyanamid Company, Industrial Chemicals Division
Aktivin Division, Heyden Chemical Corp.
B. F. Goodrich Chemical Co.
Naugatuck Chemical Division of U. S. Rubber Co.
Nopco Chemical Co.

PLATERS
Gibbs-Brower Company, Inc.
Perkins & Son, Inc., B. F.

PLATES
Armco Steel Corp.
Babcock & Wilcox Co.
J. O. Ross Engrg. Corp.
Lukenweld Division
Lukens Steel Company
Timken Roller Bearing Co.

PLUGS
The Appleton Machine Co.
Black Clawson Company
E. D. Jones & Sons Co.
The Noble & Wood Machine Co.
Shartle Brothers Machine Co.

POPE TYPE REELS
Black-Clawson Co.
Egan, Frank W., & Co.
Manchester Machine Co.
Rice Barton Corporation

PRECISION SAMPLE CUTTER
Testing Machines, Inc.
Thwing-Albert Instrument Co.

PRESERVATIVES
E. I. du Pont de Nemours & Co.
General Dyestuff Corp.

PRESS ROLLS
Beloit Iron Works
Black-Clawson Co.
Rice Barton Corporation

PRESSURE FILTERS
Holyoke Machine Co.

PRESSURE VESSELS
Chicago Bridge & Iron Co.
Combustion Engineering-Superheater, Inc.

PRESSES
Black Clawson Company
Dietz Machine Works
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Hudson-Sharp Mch. Co.
The Moore & White Co.
Potdevin Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.
Waldron Corp., John
H. G. Weber & Co., Inc.
Williams Apparatus Co.

PULLEYS
Black-Clawson Co.
Lovejoy Flexible Coupling Co.
Rice Barton Corporation

PULP CLASSIFIER
The Bauer Bros. Co.
Thwing-Albert Instrument Co.

PULP CLEANERS
Nichols Engrg. & Research Corp.

PULP STOCK VALVES
Crane Company
Record Fdy. & Mach. Co.
Shartle Brothers Machine Co.

PULPERS
Apmew, Inc.
Bauer Brothers Co.
Dilts Machine Works
E. D. Jones & Sons Co.
Morden Machines Co.
The Noble & Wood Machine Co.
Shartle Brothers Machine Co.

PULPS
Alpha Cellulose Corp.
Brown Company
Bulkley, Dunton Pulp Co., Inc.
Bunge Pulp & Paper Co.
Gottesman & Co., Inc.
Lyddon & Co. (America), Inc.
Nordicus, Ins.
Parsons & Whittemore, Inc.
Perkins-Goodwin Co.
Price & Pierce, Ltd.
Pulp and Paper Trading Co.
Restigouche Co., Ltd.

PULPSTONES
Norton Company

PULP TESTERS
Williams Apparatus Co., Inc.

PULVERIZING MILLS
Combustion Engineering-Superheater, Inc.
Jeffrey Mfg. Co.
F. L. Smith & Co.

PUMPS
Allis-Chalmers Mfg. Co.
Apmew, Inc.
The Bagley & Sewall Company
Beloit Iron Works
Black Clawson Company
Buffalo Pumps, Inc.
Byron Jackson Co.
DeLaval Steam Turbine Co.
Downingtown Mfg. Co.
Fairbanks, Morse & Co.
Gibbs-Brower Company, Inc.
Johnson Corp.
Moore & White Co.
The Noble & Wood Machine Co.
Nash Engineering Co.
Roots Connersville Blower Corp.
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.

RADIANT BURNERS
Red-Ray Mfg. Co., Inc.

RAG COOKING PROCESSES
The Kinsley Chemical Company
General Dyestuff Corp.
Rohm & Haas Co.

RAG CUTTERS
Gibbs-Brower Company, Inc.
B. F. Perkins & Son, Inc.
Taylor-Stiles & Co.

RECOVERY SYSTEMS
Babcock & Wilcox Co.
Chicago Bridge & Iron Co.
Combustion Engineering-Superheater, Inc.
Moore & White Co.
D. J. Murray Mfg. Co.
Pusey & Jones Corp.
Ross Engineering Corp., J. O.
Valley Iron Works Co.

REELS
The Appleton Machine Co.
The Bagley & Sewall Company
Beloit Iron Works
Black Clawson Company
Dilts Machine Works (Kohler Systems)
Egan, Frank W., & Co.
Downingtown Mfg. Co.
Hudson-Sharp Mch. Co.
Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
The Smith & Winchester Mfg. Co.
Waldron, John, Corp.

REFINERS
Appleton Machine Co.
Bahr Brothers Mfg. Co.
Bauer Brothers Co.
Dilts Machine Works
Gibbs-Brower Company, Inc.
E. D. Jones & Sons Co.
Morden Machines Co.
Murray, D. J., Mfg. Co.
The Noble & Wood Machine Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Sprout Waldron & Co., Inc.
Sutherland Refiner Corp.
Valley Iron Works

REGULATORS
APMEW, Inc.
Allis-Chalmers Mfg. Co.
Bird Machine Company
General Electric Co.
Johnson Corp.
Shartle Brothers Machine Co.
Taylor Instrument Companies

RESINS
American Cyanamid Company, Plastics & Resins Division
The Dow Chemical Company
B. F. Goodrich Chemical Co.
The Goodyear Tire & Rubber Company
Hercules Powder Co.
Monsanto Chemical Company
Naugatuck Chemical Division of U. S. Rubber Co.
Nopco Chemical Co.
Plaskon Division, Libbey-Owens-Ford Glass Co.
Reichhold Chemicals, Inc.
Rohm & Haas Co., Resinous Products Div.

ROLLS
Appleton Machine Co.
The Bagley & Sewall Company
Beloit Iron Works
Black Clawson Company
Dilts Machine Works
Downingtown Mfg. Co.
Frank W. Egan & Co.
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Holyoke Machine Co.
Lobdell United Co.
Edward J. McBride Co., Inc.
The Moore & White Co.
D. J. Murray Mfg. Co.
The Noble & Wood Machine Co.
Perkins, B. F., & Sons Co.
Pusey & Jones Corp.
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
U. S. Rubber Co.
Valley Iron Works Co.
Waldron Corp., John
Wheeler Roll Co.

ROLL COVERS
The Goodyear Tire & Rubber Company

ROLL HANDLING EQUIPMENT
Dilts Machine Works (Kohler Systems)

ROLL STANDS
Cameron Machine Co.
Dilts Machine Works (Kohler Systems)
Frank W. Egan & Co.
Johnstone Engrg. & Mch. Co.
Moore & White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
John Waldron Corp.
H. G. Weber & Co., Inc.

ROPE CARRIERS
Black Clawson Co.
The Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works

ROTARY KILNS
F. L. Smidth & Co.

ROTARY STEAM JOINTS
Johnson Corp.
The Moore & White Co.
Rice Barton Corporation
Shartle Bros. Mch. Co.

RUBBER PRODUCTS
The Goodyear Tire & Rubber Company

SATURANTS
B. F. Goodrich Chemical Co.

SATURATING MACHINES
Dilts Machine Works
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Moore & White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman G.

SAVEALLS
Bird Machine Company
Chicago Bridge & Iron Co.

SAWS
Simonds Saw & Steel Co.

SCALES
Fairbanks, Morse & Co.
Merrick Scale Mfg. Co.
Testing Machines, Inc.

SCREEN PLATES
Bird Machine Company
Fitchburg Screen Plate Co.
Magnus Metal Corp.
Morey Paper Mill Supply Co.
Testing Machines, Inc.
Union Screen Plate Co.

SCREENS
Allis-Chalmers Mfg. Co.
Appleton Wire Works
Appleton Machine Company
The Bagley & Sewall Company
Bird Machine Company
Carthage Machine Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Fibre Making Processes, Inc.

Gibbs-Brower Company, Inc.
E. D. Jones & Sons Co.
Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

SHEET MACHINES
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Valley Iron Works Co.
Williams Apparatus Co., Inc.

SHEET MACHINES—LABORATORY
The Noble & Wood Machine Co.

SHEETERS
Jagenberg-Werke Akt. Ges.

SHOWER PIPES
Bird Machine Company
Black-Clawson Co.
Downingtown Mfg. Co.
Moore & White Co.
Sandusky Fdy. & Mch. Co.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.

SHREDDERS
Bauer Brothers Co.
Carthage Machine Co.
Gibbs-Brower Company, Inc.
Jeffrey Mfg. Co.

SIZE PRESSES
Black-Clawson Co.
Manchester Machine Co.
Rice Barton Corporation

SIZING
American Cyanamid Company, Industrial Chemicals Division
The Dow Chemical Company
du Pont, E. I., de Nemours & Co.
Glidden Company
Hercules Powder Co.
The Hubinger Co.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

SIZING TESTER
W. & L. E. Gurley
Testing Machines, Inc.
Thwing-Albert Instrument Co.
Williams Apparatus Co., Inc.

SLIME CONTROL
The Dow Chemical Company
E. I. du Pont de Nemours & Co.
General Dyestuff Corp.
Monsanto Chemical Co.
National Aluminate Corp.
Rohm & Haas Co.
Vanderbilt Co., R. T.
Wyandotte Chemicals Corp., Michigan Alkali Div.

SLITTERS
The Bagley & Sewall Company
Black Clawson Company
Cameron Machine Co.
Carthage Machine Co.
Clark-Aiken Co.
Dietz Machine Works
Dilts Machine Works
Downingtown Mfg. Co.
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Graphic Arts International Corp.
Thomas W. Hall Co., Inc.
Hamblet Machine Co.
Hudson-Sharp Mch. Co.
Jagenberg-Werke Akt. Ges.
Johnstone Engrg. & Mch. Co.
Langston Co., Samuel M.
Moore & White Co.
D. J. Murray Mfg. Co.
Rice Barton Corporation
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

SMOKE STACKS
Chicago Bridge & Iron Co.

SOFTNESS-STIFFNESS TESTER
W. & L. E. Gurley
Testing Machines, Inc.
Thwing-Albert Instrument Co.

SOLUBLE OILS
American Cyanamid Company, Industrial Chemicals Division
General Dyestuffs Corp.
Nopco Chemical Co.

SPECIAL MACHINERY
Dilts Machine Works
Egan, Frank W., & Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
John Waldron Corp.

SPLICING TISSUE
Bunge Pulp & Paper Co.
Williams-Gray Co.

STAINLESS STEEL
Armco Steel Corp.
Michigan Steel Casting Co.
U. S. Steel Corp.

STARCH
Clinton Foods, Inc.
The Hubinger Co.
National Starch Products Inc.

STEAM JOINTS
The Moore & White Co.
Rice Barton Corporation
Shartle Bros. Mch. Co.

STEAM SPECIALTIES
Babcock & Wilcox Co.
Combustion Engrg. Co., Inc.
Johnson Corp.

STEEL
Armco Steel Corp.
Carnegie Illinois Steel Co.
Lukens Steel Company
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Works
U. S. Steel Corp.

STEEL, CLAD
Babcock & Wilcox Co.
Lukens Steel Company

STEEL TANKS
Chicago Bridge & Iron Co.
The Sandy Hill Iron & Brass Works

STRETCH TESTER
Thwing-Albert Instrument Co.

STUFF CHESTS
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
Shartle Brothers Machine Co.
Valley Iron Works Co.

SUCTION BOXES
Black Clawson Company
Downingtown Mfg. Co.
E. D. Jones & Son Co.
Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

SUCTION ROLLS
Beloit Iron Works

SULPHUR
Texas Gulf Sulphur Co.

SULPHUR BURNERS
Valley Iron Works Co.

SULPHUR DIOXIDE
American Cyanamid Company, Calco Chemical Div.
Virginia Smelting Co.

SUPERCALENDERS
The Appelton Machine Co.
B. F. Perkins & Son, Inc.

SYNTHETIC LATICES
American Cyanamid Company, Industrial Chemicals Division
B. F. Goodrich Chemical Co.
The Goodyear Tire & Rubber Company
Naugatuck Chemical Division of U. S. Rubber Co.
Nopco Chemical Co.

TAKE OFF UNITS
Dilts Machine Works (Kohler Systems)

TALC
American Cyanamid Company, Industrial Chemicals Division
Vanderbilt Co., R. T.

TANKS
Chicago Bridge & Iron Co.
Kalamazoo Tank & Silo Co.
The Noble & Wood Machine Co.
B. F. Perkins & Sons, Inc.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

TEARING TESTERS
Thwing-Albert Instrument Co.
Testing Machines, Inc.

TENSILE TESTERS
Bunge Pulp & Paper Co.
Thwing-Albert Instrument Co.
B. F. Perkins & Son, Inc.
Testing Machines, Inc.
Nopco Chemical Co.

THICKENERS, DECKERS AND SAVEALLS
The Appleton Machine Co.
Bird Machine Company
Carthage Machine Co.
Chicago Bridge & Iron Co.
Dilts Machine Works
Downingtown Mfg. Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

TITANIUM
American Cyanamid Co., Calco Chemical Div.
E. I. du Pont de Nemours & Co.
Titanium Pigment Co.
R. T. Vanderbilt Co.

TOOLS
Walworth Company

TRACTORS AND TRUCKS
Elwell Parker Elec. Co.
Towmotor Corp.

TRANSMISSIONS
Alexander Bros. Belting Co.
Dodge Mfg. Corp.
Jeffrey Mfg. Co.
Lovejoy Flexible Coupling Co.

TRAPS
Crane Co.
Johnson Corporation
Shartle Bros. Mch. Co.

TUBE MILLS
F. L. Smidth & Co.

TUBES
Babcock & Wilcox Co.
National Tube Co.

TUBING MACHINES
Dilts Machine Works

TUBING, MECHANICAL
National Tube Co.

TUBS
The Noble & Wood Machine Co.
Shartle Brothers Machine Co.
Valley Iron Works Co.

TURBINES
Allis-Chalmers Mfg. Co.
De Laval Steam Turbine Co.
General Electric Company

UNWINDERS
Dilts Machine Works (Kohler Systems)
Egan, Frank W., & Co.
Johnstone Engrg. & Mch. Co.
Rice Barton Corporation
John Waldron Corp.

USED EQUIPMENT
Gibbs-Brower Co.
Thomas W. Hall Co.
J. J. Ross Company
Ross Paper Machy. Co.
Shartle Brothers Machine Co.

V-BELTS
Lovejoy Flexible Coupling Co.

VALVES
The Bagley & Sewall Company
Crane Company
DeZurick Shower Co.
Dilts Machine Works
Fabri Valve Co. of America
E. D. Jones & Sons Co.
Magnus Metal Corp.
D. J. Murray Mfg. Co.
The Noble & Wood Machine Co.
William Powell Co.
Record Fdy. & Mch. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Stickle Steam Specialties Co.
Valley Iron Works Co.
Walworth Company

VATS
Black-Clawson Co.
Beloit Iron Works
Rice Barton Corporation

WASHERS
The Bagley & Sewall Company
Bird Machine Company
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
E. D. Jones & Sons Co.
Moore & White Co.
The Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

WASTE TREATING EQUIPMENT
Hungerford & Terry, Inc.
Jeffrey Mfg. Co.

WATER CONDITIONING
Calgon, Inc.
General Dyestuff Corp.
Hungerford & Terry, Inc.
National Aluminate Corp.
The Permutit Company
The Sandy Hill Iron & Bass Works

WATER DISPERSIONS
American Cyanamid Company Industrial Chemicals Division
Naugatuck Chemical Division of U. S. Rubber Co.
Rohm & Haas Co., Resinous Products Div.

WATER FILTERS
Holyoke Machine Co.

WATER FINISH EQUIPMENT
The Permutit Company

WATER PENETRATION TESTER
Thwing-Albert Instrument Co.
Williams Apparatus Co., Inc.

WATER SOFTENERS
Hungerford & Terry, Inc.
The Permutit Company
Wyandotte Chemicals Corp. Michigan Alkali Div.

WATER VAPOR CUPS
Thwing-Albert Instrument Co.

WAXES
Bunge Pulp & Paper Co.

WAXING MACHINERY
Black Clawson Company
Dilts Machine Works
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
The Mayer Machine Co.
Potdevin Machine Co.
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman G.

WEB TENSION CONTROL
Dilts Machine Works (Kohler Systems)
Egan, Frank W., & Co.
John Waldron Corp.

WELDING EQUIPMENT
General Electric Company
Walworth Company

WET MACHINES
The Bagley & Sewall Company
Black Clawson Company
Carthage Machine Co.
Downingtown Mfg. Co.
Moore & White Co.
The Noble & Wood Machine Co.
Pusey & Jones Company
Rice Barton Corporation
The Sandy Hill Iron & Bass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

WET STRENGTHENING AGENTS
Plaskon Div.
Libbey-Owns-Ford Glass Co.
Reichhold Chemicals, Inc.

WETTING AGENTS
American Cyanamid Company Industrial Chemicals Division
Diamond Alkali Co.
General Dyestuff Corp.
Monsanto Chemical Company
Nopco Chemical Co.
Plaskon Division Libbey-Owens-Ford Glass Co.
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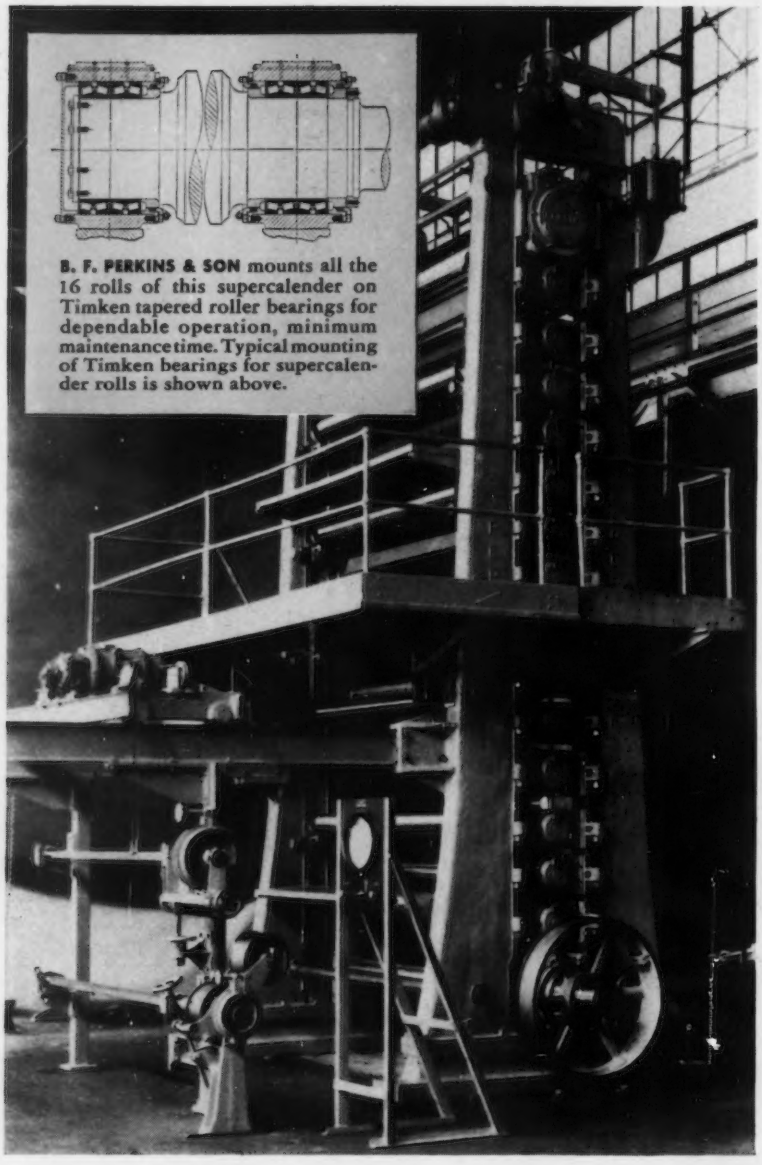

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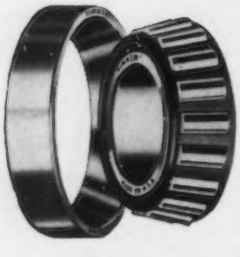

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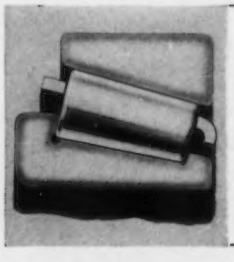

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